

DIVERSITY OF BUTTERFLIES IN PUSHPAGIRI WILDLIFE SANCTUARY, CENTRAL WESTERN GHATS, KARNATAKA

M.P. Krishna*

* Assistant Professor, Department of Zoology, Field Marshal K. M. Cariappa
Mangalore University College, Madikeri 571201, Karnataka, India.

ABSTRACT

Butterflies are very sensitive to pollution and have been used as bio-indicators to detect the pollution levels. They play a vital role in pollination of various flowering plants besides a key component of food chain. Different species of plants and habitats of Pushpagiri Wildlife Sanctuary attract wide variety of butterflies. The present investigation has been carried out to enumerate the butterfly diversity and abundance. The study has been carried from September 2016 – February 2017 in Pushpagiri Wildlife Sanctuary, Central Western Ghats, Karnataka. Data of butterfly fauna was collected by conducting random surveys by all search out method during the morning hours. Identification of the butterflies will be primarily made directly in the field and by using standard reference materials. A Total of 48 species of butterflies belonging to 5 families 44 genera were recorded. Out of these, family Nymphalidae were dominant with (22 species) followed by Papilionidae (10 species), Hesperidae (09 species), Pieridae (04 species) and Lycaenidae (03 species) were recorded. Four species those are endemic to the Western Ghats including *Papilio budha*, *Papilio dravidarum*, *Troides minos*, and *Atrophaneura pandiyana*. The different habitats of the study area are home to endemic and protected species, it needs conservation to protect the butterfly fauna of this region.

Key words: Abundance, Bioindicators, Endemic species, Landscape, Pollinators,

INTRODUCTION

The butterflies are important bioindicators and one of the most interesting and fascinating insect groups which should be protected to conserve the biodiversity and environment. The butterfly fauna of the southern part of the Indian peninsula is very rich and diverse compared to other parts of the peninsula due to the availability of diverse habitats, a wide range of altitudinal gradients and associated microclimatic regimes. India enjoys tropical climate, variance in topographic and habit types suitable for sustaining a variety of butterfly fauna (Venkataramani, 1986). One fifth of the world's total butterflies are available in India (Haribal, 1992). The butterflies are selective in their choice of flowers and plants they visit. There is

an intimate association between butterflies and plants (Uniyal and Mehra, 1996). The rate of visit of butterflies to a flower depends on color, odor and the shape of the flower. Butterflies and their caterpillars are dependent on specific host plants for foliage, nectar and pollen as their food. Thus, butterfly diversity indirectly reflects overall plant diversity, especially that of herbs and shrubs, in the given area. Change in land use pattern leads to landscape changes that can reflect change in butterfly diversity and distribution. Butterflies are excellent pollinators and bio control of weeds. Butterflies are very sensitive to pollution and have been used as bio-indicators to detect the pollution levels. Certain species are used for experiments in genetic engineering. India has a rich butterfly fauna comprising of 1501 species out of 16,823 species recorded from all over the world (Gaonkar, 1996) of the various butterfly habitats found in India, the Western Ghats is one of the most diversified areas containing a wide variety of species due to the typical eco-climatic and geographic features. Butterflies are very important to the environment. They are excellent group for communication information in science and conservation issues, and an excellent indicator of the ecological condition of the most terrestrial habitats (Koplins and Opler, 1997). The southern Western Ghats is home to hundreds of species of rare, endemic and species of colourful butterflies, some of them extremely rare. Some species are so rare that they are found nowhere else in the world. The largest Indian butterfly (Common Birdwing) and the smallest (Southern Grass Jewel) occur in the peninsular India. In the Western Ghats, 330 species of butterflies are recorded. Maximum diversity 316 species have been reported in the Nilgiri biosphere reserve (Gaonkar, 1996). Different species of plants and habitats of Pushpagiri Wildlife Sanctuary attract wide variety of butterflies. They play a vital role in pollination of various flowering plants besides a key component of food chain. There are no studies carried out on butterfly diversity of Pushpagiri Wildlife Sanctuary. Hence an attempt was made to fill the lacuna through the Investigations on the diversity and abundance of butterflies at the Sanctuary.

MATERIALS AND METHODS

Study area,

Pushpagiri Wildlife Sanctuary (12°25' N to 12°35' N Latitude; 75°25' E to 75°45' E) is situated on the northwest boundary of the Kodagu district Central Western Ghats, Karnataka State. The sanctuary spread over an area of 102.92 sq. Km and present at 1712m above sea level. Temperature in the region varies from 10°C during winter 34° C during summer. Annual rainfall ranges between 6000mm -7000mm. Sanctuary has dense evergreen, semi evergreen, shola and grasslands, characteristic of higher altitudes of the Western Ghats. The field survey was carried out in evergreen, semi evergreen, shola forests and grasslands, during September 2016 – February 2017. Data of butterfly fauna was collected by conducting random surveys by all search out method during the morning hours. Identification of the butterflies will be primarily made directly in the field. In critical condition, butterfly will be photographed or recorded by

digital camera and the photograph will be taken to the laboratory for further identification with the help of field guide (Wynther- Blyth 1957; Kunte 2000; Kehimkar 2008; Gunathilagaraj *et al.*, 2015)) and specialist.

RESULTS AND DISCUSSION

A Total of 48 species of butterflies belonging to 5 families 44 genera were recorded, including four species that are endemic to the Western Ghats (**Table-1**). Out of these, family Nymphalidae were dominant with (22 species) followed by Papilionidae (10 species), Hesperidae (09 species), Pieridae (04 species) and Lycaenidae (03 species) were recorded (**Fig.1**). The relative abundance of butterflies were calculated and presented in (**Table-2**). Among the five families, Nymphalidae were found to be most dominant members with 45.83% followed by Papilionidae 20.84%, Hesperidae 18.75%, Pieridae 8.33% and less dominant member Lycaenidae 6.25% (**Fig.2**). As per our study very common species were *Melanitis leda*, *Mycalesis mineus*, *Papilio polymnestor*, *Spialia galba*, *Iambrix salsala* and *Castalius rosimon* and two species Endemic to Western Ghats *Papilio budha* and *Atrophaneura pandiyana* are very rarely seen in our study area and *Euripus consimilis*, *Telicota ancilla*, *Sarangesa dasahara*, *Delias eucharis* and *Euchrysops cnejus* were other very rare species in the study area are recorded.

The butterfly count and species distribution depends on the influence of rain fall (Hogsden and Hutchinson, 2004). The abundance of butterfly species population in the selected study area may be due to the availability of favourable tropical climate and topographic features of different regions (Ravindra *et al.*, 1996; Tiple and Khurad, 2009; Subba *et al.*, 2006) The preference of butterfly species at a particular habitat also depends upon other factors like abundance of predators, parasites and prevalence of diseases. The butterflies prefer moist places and avoid dry habitat. In our study the diversity and abundance of Nymphalidae, Papilionidae and Hesperidae are more during the months of September and October because of the availability of nectar and many shrubs are blooming. The prolonged rains during monsoon season in the study locality create many perennial hill streams, ponds marshy areas and temporary water regimes. Such habitats besides providing moist environment, endowed with flowers and fruits in the forest vegetation, which leads to increased butterflies density. Most of the earlier investigators diversity of butterfly species in the Southern Western Ghats of Tamil Nadu and Kerala (Sundarraj *et al.*, 2016; Dilla Jose and Senthilkumar, 2016) have reported the more dominance of Nymphalidae family our results are corroborating with these findings.

Table 1: Check list of Butterflies recorded in Pushpagiri Wildlife Sanctuary

SI No.	Common name	Scientific name	Status
	FAMILY: Nymphalidae		

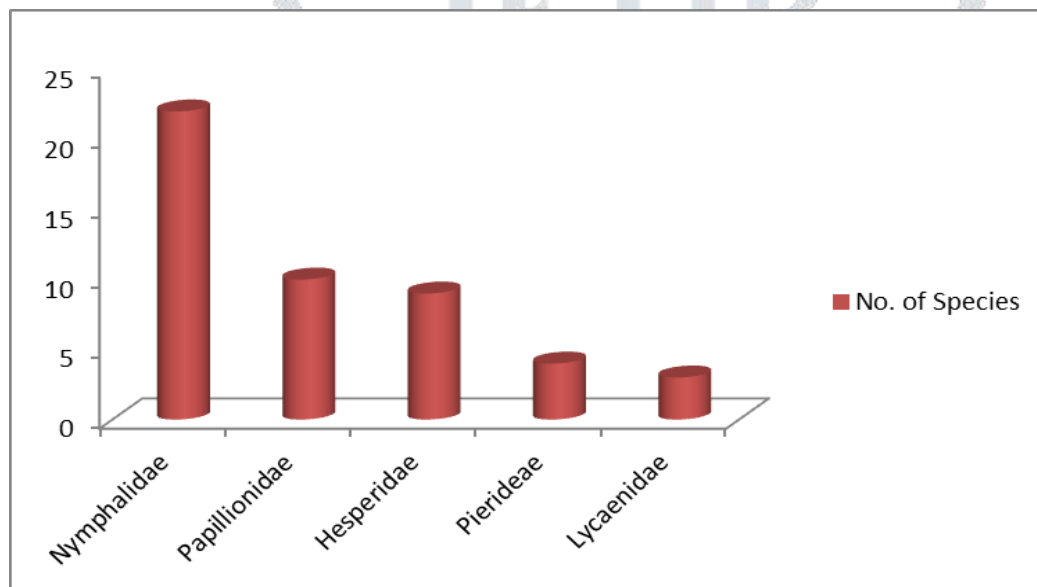
1	Blue Tiger	<i>Tirumala limniace</i>	C
2	Common Palm fly	<i>Elyminas hypermnestra</i>	O
3	Plain Tiger	<i>Danaus chrysippus</i>	O
4	Common Evening Brown	<i>Melanitis leda</i>	VC
5	Double Brand Crow	<i>Euploea sylvester</i>	C
6	Blue Tiger	<i>Tirumala limniace</i>	C
7	Glassy Blue Tiger	<i>Parantica aglea</i>	O
8	Dark Brand Bushbrown	<i>Mycalesis mineus</i>	VC
9	Common Evening Brown	<i>Melanitis leda</i>	O
10	Great Eggfly	<i>Hypilimnas bolina</i>	C
11	Peacock Pansy	<i>Junonia almana</i>	R
12	Striped Tiger	<i>Danaus genutia</i>	R
13	Common Palm Fly	<i>Euripus consimilis</i>	VR
14	Common Indian Crow	<i>Euploea core</i>	O
15	Commander	<i>Limenitis procris</i>	C
16	Common Sailer	<i>Neptis hylas</i>	C
17	Common Five Ring	<i>Ypthima baldus</i>	O
18	Lemon Pansy	<i>Junonia lemonias</i>	O
19	Blue Morpho	<i>Morpho peleides</i>	R
20	Plain Tiger	<i>Danaus chrysippus</i>	C
21	Long-Brand Bush brown	<i>Mycalesis visala</i>	C
22	Chocolate Pansy	<i>Precis iphita</i>	O
FAMILY: Papilionidae			
23	Malabar Banded Peacock	<i>Papilio budha**</i>	VR
24	Blue Mormon	<i>Papilio polymnestor</i>	VC
25	Common Mormon	<i>Papilio polytes</i>	O
26	Malabar Raven	<i>Papilio dravidarum**</i>	O
27	Paris Peacock	<i>Papilio paris</i>	C

28	Tailed Jay	<i>Graphium agamemnon</i>	R
29	Common Rose	<i>Pachliopta aristolochiae</i>	O
30	Southern Birdwing	<i>Troides minos**</i>	R
31	Crimson Rose	<i>Pachliopta hector</i>	O
32	Malabar Rose	<i>Atrophaneura pandiyana**</i>	VR
FAMILY :Hesperiidae			
33	Indian Skipper	<i>Spialia galba</i>	VC
34	Dark Palm Dart	<i>Telicota ancilla</i>	VR
35	Common Dartlet	<i>Oriens goloides</i>	R
36	Water Snow Flat	<i>Tagiades litigiosa</i>	O
37	Common Banded Awl	<i>Hasora chromus</i>	R
38	Common Small Flat	<i>Sarangesa dasahara</i>	VR
39	Chestnut Bob	<i>Iambrix salsala</i>	VC
40	Common Grass Dart	<i>Taractrocera maevius</i>	C
41	Rice Swift	<i>Barbo cinnara</i>	O
FAMILY: Pieridae			
42	Common Emigrant	<i>Catopsilia Pomona</i>	C
43	Common Albatross	<i>Appias albinia</i>	O
44	Common Jezebel	<i>Delias eucharis</i>	VR
45	Small Cabbage White	<i>Pieris rapae</i>	R
FAMILY: Lycaenidae			
46	Common Pierrot	<i>Castalius rosimon</i>	VC
47	Gram Blue	<i>Euchrysops cnejus</i>	VR
48	Common Cerulean	<i>Jamides celeno</i>	O

** Endemic to Western Ghats; VC- Very Common; C-Common; O-Occasional; R-Rare; VR- Very Rare.

Table : 2 Relative abundance of Butterflies at Pushpagiri Wildlife Sanctuary

Sl No	Family	No. of Genera	Relative abundance (%)	No. of Species	Relative abundance (%)
1	Nymphalidae	22	50	22	45.83
2	Papilionidae	06	13.64	10	20.84
3	Hesperiidae	09	20.45	09	18.75
4	Pieridae	04	9.09	04	8.33
5	Lycaenidae	03	6.82	03	6.25
	Total	44	100	48	100

**Fig: 1. Family wise distribution of butterfly species in Pushpagiri Wildlife Sanctuary**

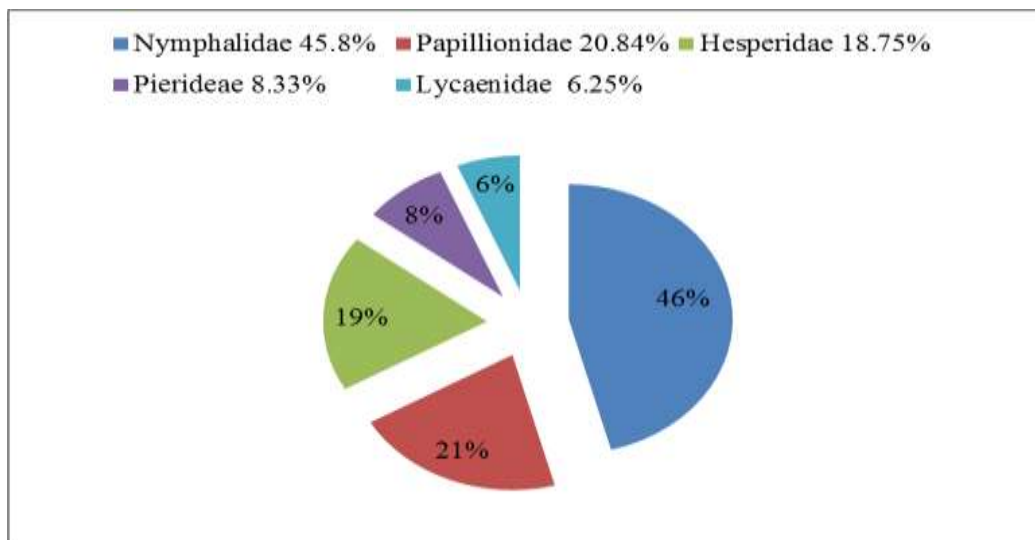


Fig. 2. Relative abundance of Butterflies at Pushpagiri Wildlife Sanctuary

CONCLUSION

The major threats to butterflies in the Pushpagiri Wildlife Sanctuary are habitat degradation, human interference. The extensive cattle grazing in certain parts of the wildlife sanctuaries is another factor causing severe damage to vegetation comprising grasses, herbs, shrubs etc. which harbors several species of butterflies. Tribal people and others regularly encroach protected areas for collecting fodder, firewood, and forest products, which negatively impacts habitat quality of butterflies. The present study revealed significant variation in butterfly species distribution, richness and diversity in different habitats in the Sanctuary due to the existing or changing pattern of vegetation and environmental conditions. It is observed that butterflies are sensitive to the changes in the habitat and climate, which influences their distribution and diversity. Observations suggest that butterfly species diversity generally increase with increase in vegetation. Hence the study on diversity of butterflies contributes to take conservation measures. The host plants are crucial for maintaining butterfly diversity, it is vital to conserve them and their landscapes. This type of study could contribute to educate the younger generation about the importance of identification, documentation and conservation of butterflies and their host plants. Therefore, further studies on the ecology and diversity of butterflies with special reference to their host plants and factors that affect their distribution, diversity and abundance will be recommended.

ACKNOWLEDGEMENTS

I would like to record my sincere thanks to Karnataka Forest Department, Kodagu district, for granting permission to carry out this study. I also thank the support of Principal, FMKMC College, Madikeri for encouragement. Special thanks to Mr. Devaraj for the help during field visit and photography.

REFERENCES

- [1] Dilla Jose and Senthilkumaar. P. (2016). Preliminary Report on the Butterfly Diversity of Muttom Panchayath, Idukki District, Kerala, India. *Int. Res. J. Biological Sci.* Vol. 5(6), 23-30.
- [2] Gaonkar. H. (1996). Butterflies of the Western Ghats, India, Including Sri Lanka: A Biodiversity Assessment of a Threatened Mountain System. Report submitted to the Centre for Ecological Sciences, Bangalore, 51 pp.
- [3] Gunathilagaraj, K., Perumal, T. N. A., Jayaram, K and Ganesh Kumar, M. (2015). South Indian Butterflies; Field Guide, pp: 359
- [4] Haribal, M. (1992). The Butterflies of Sikkim and their Natural History. Sikkim Nature Conservation Foundation, Gangtok. 217pp.
- [5] Hogsden, K.L. and Hutchinson T.C. (2004). Butterfly assemblages along a human disturbance gradient in Ontario, Canada. *Canadian Journal of Zoology*, 82(5), 739-748.
- [6] Kehimkar, I. (2008). The Book of Indian Butterflies. *Bombay Natural History Society* Oxford University Press, Oxford, New York.
- [7] Koplins, R. and Opler, P. (1997). Butterfly Diversity and a Preliminary Comparison with Bird and Mammals Diversity. *Biodiversity*. (2): 69-75.
- [8] Kunte, K. (2000). India-A Life cape – butterflies of peninsular India (Editor Madhav Godgil and Forward E.O. Wilson). Indian Academy of Sciences, Universities Press, India, I: 1-286.
- [9] Ravindra M., Viswantathan S. and Ram G.M. (1996). Checklist of butterfly species of Osmania University Campus, Hyderabad. *Zoo's Print journal*, 11(10), 5.
- [10] Subba R.C., Atluri J.B., Venkata Ramana S.P. and Meer B.G. (2006). The butterfly fauna of Vishakapatnam in South India. *Tiger*, (30), 29-32.
- [11] Sundarraj, R.S., S.Banupriya and Jeyabalan. D. (2016). Diversity of Butterflies in Gudalur forest area, Nilgiri hills, Southern Western Ghats, India. *Int. J. Adv. Res. Biol. Sci.* (2016). 3(5): 160-167
- [12] Tiple, A.D. and Khurad, A.M. (2009). Butterfly species diversity, habitats and seasonal distribution in and around Nagpur City, Central India. *World Journal of Zoology*, 4(3), 153-167
- [13] Uniyal, V. P. and Mehra, B. S. (1996). *Zoo's Print Journal*. 1(9), 7-11.
- [14] Venkataramani, G. (1986). In the shadow of extinction. In: *Frontline. India's National Magazine*.
- [15] Wynter-Blyth, MA. (1957). Butterfly of the Indian region. *The Bombay Natural History Society*.