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BUTTERFLY DIVERSITY, SEASONALITY AND STATUS IN LAKKAVALLI RANGE OF BHADRA WILDLIFE SANCTUARY, KARNATAKA

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Abstract

Butterflies are important bioindicators which should be protected to conserve the biodiversity and environment. Different species of plants and habitats of Lakkavalli range attract wide variety of butterfly fauna, which play a vital role in pollination of various flowering plants besides a key component of food chain. Regular survey were conducted from November 2009 to October 2010 by visual observation. A total of 54 species of butterflies belonging to eight families viz., Papilionidae, Lycaenidae, Nymphalidae, Danaidae, Satyridae, Acracidae, Pieridae ,Hesperidae were recorded, Out of which 16 species were abundant, 20 species common and 18 species rare. The study of seasonal variation revealed that 44 species present in monsoon which increased to 49 in winter and a least of 26 species in summer and 20 species were recorded all-round the year.

Keywords: Seasonality, Status, diversity, Lakkavalli

Introduction

Butterflies are the most tantalizing and beautiful creatures, among the insect group, they are an often regarded as flagship species. These are perhaps the most studied and well-known insect groups. Butterflies along with moths belong to the order Lepidoptera. In terms of indicator organisms for biodiversity studies on butterflies are an excellent choice as they are common almost everywhere, attractive and easy to observe. The butterfly diversity is high in the tropics compared to temperate regions of the world. Their habitat ranges from Arctic to the great deserts of the world. The butterflies are divided into two super families' viz., Papilionoidea constitutes 11,100 species and Hesperioidea constitutes 3,650 species in the world (Scott, 2001).

Other than their aesthetic value, butterflies have important roles in the functioning of forest ecosystems. Because of their diversity, wide distribution, specificity to vegetation type, rapid response to perturbation, taxonomic tractability, statistically significant abundance and ease of sampling, they have been considered useful organisms to monitor environmental changes.

There are 16,823 species recorded from all over the world among them 1501 species of butterflies are recorded in from India (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 seasonal in their occurrence. They are common for only a few months and rare or absent in others. The seasons when they are rare or not active as adults are usually spent either as caterpillars or as pupae. The months when the adults are active are called the "flight period". Distinct flight periods naturally imply seasonality of the early stages of butterflies as well. Thus occur in different seasons (Kunte, 2000). The review of literature available on the Indian butterfly species of Western Ghats is reviewed (Raja Shakar, 1995).

In this paper an attempt is made to study diversity of status and seasonal occurrence of butterflies in Lakkavalli state forest, Bhadra Wildlife Sanctuary.

MATERIALS AND METHODS

Study area

The study was carried out in Lakkavalli range of Bhadra Wildlife Sanctuary, consisting an area of 223.17 sq. kms (13°34' to 13°46'N latitude and 75°29' to 75°45'E longitude) in the Karnataka state of Southern India. The altitude varies from 650 mts-1875 mts above sea level with a general elevation of 1200-1500 mts. The sanctuary is located in the Malnad region of Karnataka about 50 kms to the east of western ghats. The temperature in the valley ranges from 9-35°C. The region receives an annual rainfall of 1600 to 2000 mm during the southwest monsoon between June and September. A distinct rainfall gradient result in a variation in vegetation type from semi evergreen forest and moist deciduous forest through dry deciduous forest shoals and grassland type forest.

Methodology

Field observations were made once in fifteen days for one year of period from November 2009 to October 2010. Identification of all sighted butterflies was recorded by direct visual observations. Collection of the butterflies was made using insect collecting net. The collected butterflies were narcotized with crystals of methanol and after air drying of the specimen, identification was carried out using various references such as Talbot (1939, 1947); Wynter-Blynth (1957); Gay et al. (1992); Gunathilagaraj et al. (1998), Kunte (2000), Evans (1932) and William J. Sutherland (1996).

The Line transact method: It was developed by the Institution of Terrestrial Ecology (Pollard, 1979) to monitor the seasonal variation and status of butterflies. Based on the specimen collected and the visual observations made during the entire study period, the status and seasonality of various butterflies of the area was listed. The status was scored using presence- absence scoring method and then percentage of abundance was calculated to determine the status. The score class used were 1-6%=Rare, 7-18%=Common, >18%=Very Common (Thakur, 2003).

RESULTS AND DISCUSSION

A complete checklist of butterfly species is given in Table1. A total of 54 species spread over 42 genera and 8 families were identified. The numbers of species recorded with families are as follows.

About 105 species of swallowtails (Papilios), out of the world's 700, are found in India, among them 19 species are present in peninsular India. Ten species have been reported from our study area during our study period, which includes the India's largest butterfly, Southern Bird Wing (*Triodes minos* Cramer) which is endemic of peninsular India. The family also includes two other species (Crimson Rose and Blue Mormon) which are endemic to Western Ghats and Sri Lanka. Lime butterfly (Papilio demoleus L.) of this family is most abundant in our study area whereas 3 other species found rare.

Lycaenidae is the most abundant family of the Western Ghats, compared to all other families (Kunte, 2000). Similar pattern was also observed in our study area. 7 butterfly species with 2 very common species and 3 common species belongs to family Lycaenidae was reported from the area during study period.

The Nymphalids are a large group of robust-bodied butterflies that come in almost every shape and colour. Highest number of butterfly species (16 sp.), belongs to this family among the total reported in the area. The species of this family are distributed throughout the area. This family includes 4 very common species and 6 rare species.

4 species belongs to Danaidae family with two very common species in our study area. Species of this family were distributed throughout the area. Among 4 species 3 species were present throughout the year, and two were very common species.

Most browns are common and often abundant, but are less seen due to their retiring habits. They keep to shady undergrowth, where they may be seen in slow, jerky flight close to the ground. 4 butterfly species having two very common species, belong to this family were reported from our study area. These species were usually sighted inside the forest and bushes. In India Acraeidae represents only two species and only one species in south India (Wynter-Blyth, 1957). Tawny Coster (Acraea violae Fabricius) of this family present in the area and it is abundant in the area.

The family Pieridae has some of the most familiar butterflies. Over 35 species are represented

in this family in peninsular India out of which 33 species are found in Western Ghats and 8 species are found in Lakkavalli range of Bhadra wildlife sanctuary, among them Common Jezebel (*Delias eucharis* Drury) is endemic to peninsular India and Sri Lanka. Common Grass Yellow (*Eurema hecabe* Linnaeuus) of this family is most abundant butterfly of the area. In this family 3 are very common species and 3 rare species.

The family Hesperidae is the third largest family of the butterflies in the world. Only 4 species belongs to this family were reported from the area during our study period, among them 3 are rare and one is common.

Seasonality and status

Butterflies are seasonal in their occurrence. They are common for only a few months and rare or absent in other parts of the year (Kunte, 2000). Table 2 represents seasonal variation in species richness of different families observed during study. In the present study, the number of butterfly species encountered during monsoon was 44, which increased to 49 species in winter and it was only 32 during species in summer. However, 20 species were recorded throughout the year.

Butterflies are sensitive to the changes in the habitat and climate, which influence their distribution and abundance (Winter-Blyth, 1957). Analysis of the status showed that 18 species are rare, 20 species common and 16 abundant in Lakkavalli range of Bhadra Wildlife Sanctuary (Table 3).

Among the 54 species recorded during the study two species (Crimson rose and Danaide eggfly) are in Schedule-I, and another two species (Common baron and Gray count) are in Schedule-II as per Indian Wildlife Protection Act (1972). The study area also contains three species (Crimson rose, Blue mormon and Common jezebel) which are endemic to Peninsular India and Sri Lanka.

Table1. Butterfly diversity with its seasonality and status in Lakkavalli range of Bhadra wildlife sanctuary

Sl. No.	Common name	Scientific name	Season	General abundance
	Papilionidae			
1	Tailed Jay	*Graphium Agamemnon* Linnaeus	W, S, M	C
2	Spotted Swordtail	*Graphium nomius* Esper	S	C
3	Common Blue Bottle	*Graphium sarpedon* Linaeus	W, M	R
4	Common Rose	*Pachliopta aristolochiae* Fabricius	W, S	C
5	Crimson Rose**	*Pachliopta hector* Linnaeus	W, S	VC
6	Lime Butterfly	*Papilio demoleus* Linnaeus	W, S, M	VC
7	Common Mormon	*Papilio polytes polytes* Linnaeus	W, S, M	C
8	Common Mormon	*Papilio polytes romulus* Cramer	W, S, M	C
9	Blue Mormon	*Papilo polymnestor* Cramer	W	R
10	Southern Birdwing *	*Troides minos* Cramer	W	R
	Lycaenidae			
11	Large Oak Blue	*Arhopala amantes* Hewitson	W	R
12	Common Pierrot	*Castalius rosimon* Fabricius	W, M	VC
13	Banded Blue Pierrot	*Discolampa ethion* Doubleday and Hewitson	W, M	C
14	Dark Cerulean	*Jamides bochus* Cramer	W, M	C
15	Common Silverline	*Spindasis vulcanus* Fabricius	W, M	R
16	Red Pierrot	*Talicada nyseus* Guerin-Meneville	W, M	C

17	Tiny Grass Blue	*Zizula hylax* Fabricius		VC
	Nymphalidae			
18	Common Castor	*Ariadne merione* Cramer	W, S, M	R
19	Jocker	*Byblia ilithyia* Drury	W, S	C
20	Rustic	*Cupha erymanthis* Drury	W, M	C
21	Baronet**	*Euthalia nais* Forster	W, M	VC
22	Great Eggfly	*Hypolimnas bolina* Linnaeus	M	R
23	Danaid eggfly**	*Hypolimnas misippus* Linnaeus	W, M	C
24	Peacock Pansy	*Junonia almana* Linnaeus	W, S, M	R
25	Yellow Pansy	*Junonia hierta* Fabricius	W, S	C
26	Lemon Pansy	*Junonia Lemonias* Linnaeus	W, S, M	VC
27	Blue Pansy	*Junonia orithya* Linnaeus	W, M	C
28	Commander	*Moduza procris* Cramer	W, M	R
29	Common Sailer	*Neptis hylas* Moore	W, S, M	VC
30	Common Leopard	*Phalanta phalantha* Drury	W, S, M	VC
31	Common Nawab	*Polyura athamas* Drury	W, M	R
32	Chocolate Pansy	*Precis iphita* Cramer	W, S, M	C
33	Grey Count	*Tanaecia lepidea* Butler	W, M	R
	Danaidae			
34	Plain Tiger	*Danaus chrysippus* Linnaeus	W, S, M	R
35	Striped Tiger	*Danaus genutia* Cramer	S, M	C
36	Common Indian Crow	*Euploea core* Cramer	W, S, M	VC
37	Blue Tiger	*Tirumala limniace* Cramer	W, S, M	VC
	Satyridae			
38	Common Evening Brown	*Melanitis leda* Linnaeus	W, S, M	VC
39	Common Bush Brown	*Mycalesis perseus* Fabricius	W, S, M	C
40	Nigger	*Orsotrioena medus* Fabricius	W, M	C
41	Common Four Ring	*Ypthima baldus* Fabricius	W, M	VC
	Acracidae			
42	Tawny Coster	*Acraea violae* Fabricius	W, S, M	VC
	Pieridae			
43	Pioneer	*Anaphaeis aurota* Fabricius	W, M	VC
44	Common Emigrant	*Catopsilia Pomona* Fabricius	W, M	C
45	Mottled Emigrant	*Catopsilia pyranthe* Linnaeus	W, S, M	VC
46	Crimson Tip	*Colotis danae* Fabricius	W	R
47	Common Jezebel**	*Delias eucharis* Drury	W	R
48	Common Grass Yellow	*Eurema hecabe* Linnaeuus	W, S, M	VC
49	Great Orange Tip	*Hebomoea glaucippe* Linnaeus	W, M	R
50	Common Wanderer	*Pareronia valeria* Cramer	W, M	C
	Hesperidae			
51	Rice Swift	*Borbo cinnara* Wallace	M	C
52	Gaint Red Eye	*Gangara thyrsid* Fabricius	W, M	R
53	Indian Skipper	*Spialia galba* Fabricius	W, S, M	R
54	White banded awl	*Hasora badra* Hubner	M	R

VC- Very Common, C- Common, R- Rare, W-winter, S-summer, M-monsoon.
*Indicates Western Ghats endemic, ** Indicates Endemic to Peninsular India and Sri Lanka.

Table 2. Distribution of genera and species of different families at the Lakkavalli range of Bhadra Wildlife sanctuary

Family	Genera	Species	% of species	Status		
				VC	C	R
Papilionidae	4	10	19	2	5	3
Lycaenidae	7	7	13	2	3	2
Nymphalidae	12	16	30	4	6	6
Danaidae	3	4	7	2	1	1
Satyridae	4	4	7	2	2	0
Acracidae	1	1	2	1	0	0
Pieridae	7	8	15	3	2	3
Hesperidae	4	4	7	0	1	3
Total	42	54		16	20	18

Table 3. Seasonal variation in number of butterfly species in Lakkavalli range of Bhadra Wildlife sanctuary

Winter	49
Summer	26
Monsoon	44
Throughout the year	20

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