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Diversity of butterfly fauna (rhopalocera: lepidoptera) from yelagiri hills Tamilnadu, India

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ABSTRACT

The study was conducted during January 2012 to December 2012. The butterflies were collected from different altitudes of Yelagiri hills. Seventy three species of butterflies from fourty six genera in five families were documented. Observations were made on the basis of different seasonal occurrence. We have also documented the rare butterflies in the study area which acknowledges the value of this region for conservation.

Introduction

The Eastern Ghats of Tamil Nadu is the great mountain ranges of the state. Yelagiri is one of the popular hill stations of Tamil Nadu. Lepidoptera is the second largest of the insect orders which comprise more than 105,000 known species in the world. So far 1500 species of butterflies have been recorded from India and 318 species have been reported from Tamil Nadu (Palot and Radhakrishnan, 2009). However, the butterfly fauna of Southern part of Eastern Ghats in Tamil Nadu has never been studied in the past. The present work incorporates detailed field observations on the distribution and diversity of butterflies in Yelagiri Hills.

The present study aims to assess the diversity of butterfly fauna in Yelagiri hills from January 2012 to December 2012.

Materials and methods

Study area:

The present study was conducted in different regions of Yelagiri hills of Eastern Ghats they are considered important biodiversity area of our country. Ponneri [12 º 59' 95 "N, 78 º 61' 48 " E, Elevation:1654 ft./500 mtrs]; Muthanoor [12º 59' 901" N, 78º 61' 985" E, Elevation: 2418 ft./737 mtrs]; Observatory [12 º60'365" N, 78º 62' 75" E, Elevation: 3104 ft./946 mtrs]; Yellagiri lake [12º 59'89" N 78 º 64' 053" E, Elevation: 3464 ft./1059 mtrs]; Athanaoor [12º 58'558" N, 12º 63'846E, Elevation 3283 ft. /1001 mtrs]; Mangalam [12º 58'48" N, 78 º 66'365 " E, Elevation: 3290 ft./1030 mtrs]; Thailoor [12º 57'103 " N 78º 68'95" E, Elevation: 3102 ft. /945 mtrs]; Nillaoor [12 º 55'513" N, 78º 63'53" E, elevation 3243 ft. /989 mtrs].

Data collection

The butterflies were collected using sweep net and the collection was done every month during January 2012 to December 2012 from 8.00 AM to 4 PM under suitable weather conditions (Temperature 18°C approx.)

Transects and butterfly data

The field method is based on standardized "Pollard walk" method (Pollard 1977; Pollard and Yates 1993). We applied line transects (100m X 100m) in the selected study areas; then butterflies were observed within 2.5 meters to the left and right side and five meters in front of the observer. Unfamiliar species were collected for identification and voucher specimens were stored at Zoological Survey of India (Southern Regional Centre). The Classification of butterfly was followed by Heppner (1898).

Diversity calculation:

The total number of individuals collected under each identified species in different habitats was recorded and diversity indices namely dominance index, Shannon's diversity indices (H′), and evenness index (e^H/S) were calculated using PAST software (PAST; version= 2.02).

Results and discussion

Species composition

In the present study we recorded 73 species of butterflies belonging to 46 genera and 5 families (Table 1.). Family Nymphalidae contributed maximum number of species (35 species) followed by Pieridae (20 species), Papilionidae (17 species), Lycaenidae (7 species) and Hesperiidae (4 species) respectively. Nymphalidae out numbered the other with maximum species throughout the study period; this could be because of their ecological adaptation (Jiggins *et al*. 1996), speciation and high dispersal ability (Adler *et al*., 1994). Similar findings were reported by Mathew and Rahamathulla (1993) and Sudeendrakumar *et al*. (2000) in Silent valley in India.

Diversity Indices

Diversity, Dominance and Evenness values were given (Table 1.). Maximum value of Shannon's diversity index (H^1) was recorded in June (0.9950) and March (0.9737) and minimum value was recorded in January (0.8674) and December

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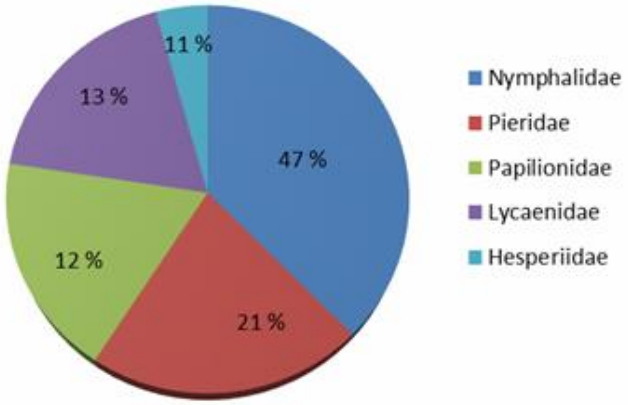
(0.814). Maximum value Simpson diversity was recorded in month of August (3.981) and April (3.892) and minimum value was recorded in December (2.657) and January (2.364). Maximum evenness value was recorded in the month of April (0.7986) and minimum evenness value was recorded in the month of November (0.4232). Maximum Menhinick value was recorded in month of February (2.954) and August (2.549) and minimum value was recorded in May (1.751) and April (1.773). Maximum Margalef value was recorded in month of March (9.681) and April (9.086) and minimum value was recorded in July (5.361) and January (3.561)



Larsen (1998) and Sparrow *et al*. (1994) had reported maximum number of species from low and semi-elevated regions. Coinciding with the earlier reports, in our study, diversity of butterfly was high in lower elevation when compared to higher elevated regions. This could be due to the favorable micro-environment for their living associated with cattle grazing, agro based human activities dampness in rocks, sand and mud along the banks of river. In addition the lower part of the forest has more gaps for light than high altitudes with a thick canopy.

Wynter- Blyth (1956) had identified two seasons, March-April and October as the peak periods in India for the species diversity and abundance. We also observed maximum species diversity and abundance in the months of March-May and October-November; and there was a gradual increase during the early summer from the month of March and it reached maximum in the month of May; a second peak was recorded in the month of October and November. Species abundance and diversity declined in two seasons, one in December-January due to extreme cold and withering of flowers (nectar source) and again in late summer, June-July due to non-availability of nectar source, over heat, and scarcity of water. Evenness index ranged 0.4232 to 0.7989 in the study area. Optimum Evenness was found between the months of June and July in our study. The similar result was obtained by (Parandhaman *et al*., 2012) from Western Ghats region.

We concluded that Yelagiri hills support a Nymphalidae dominant butterflies community. The present study butterflies comunity did show the significant variation based on the altitudes. Increasing forest fragmentation also decline the butterflies in the study area. Hence the selected area considered importance of conservation measures.

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Table 1. Diversity calculation of Butterflies from Yelagiri hills, Tamil Nadu, India

Month & Year	No. of taxa collected	Individuals	Dominance e	Shannon_H	Simpson_D	Evenness_e^H/S	Menhinick	Margalef
Jan	15	51	0.08626	0.8674	2.264	0.7081	2.343	3.77
Feb	41	193	0.03709	0.9592	3.311	0.7488	3.048	7.695
Mar	64	670	0.002582	0.9737	3.783	0.76581	2.508	9.724
Apr	67	1418	0.02198	0.9782	3.892	0.7986	1.792	9.113
May	75	1278	0.044996	0.9617	3.598	0.6508	1.835	8.97
June	35	276	0.05736	0.9950	3.425	0.7285	2.107	6.049
July	29	185	0.050058	0.9426	3.153	0.7100	2.132	5.364
Aug	47	340	0.04285	0.9557	3.981	0.6814	2.549	7.892
Sep	57	511	0.03795	0.9763	3.413	0.6899	2.356	8.351
Oct	55	822	0.03025	0.9730	3.709	0.7415	3.428	8.789
Nov	42	445	0.06981	0.9302	3.105	0.4232	3.666	7.892
Dec	27	148	0.0789	0.8814	2.657	0.5917	3.054	5.532
Total	554	6364						

Table 2. List of butterflies from Yelagiri hills during January 2012 to December 2012

Scientific Name	*Common Name*	*Seasonal Occurrence*
Family: Papilionidae		
Subfamily Papilioninae		
Genus: *Graphium*		
Graphium doson (C. & R. Felder, 1864)	Common Jay	W,M
Graphium agamemnon (Linnaeus, 1758)	Tailed Jay	S
Graphium sarpedon (Linnaeus, 1758)	Common Bluebottle	W,M
Genus: *Pachliopta*		
Pachliopta aristolochiae (Fabricius, 1775)	Common Rose	W,S
Pachliopta hector (Linnaeus, 1758)	Crimson Rose	W,S,M
Genus: *Chilasa*		
Chilasa clytia, Linnaeus, 1758	Common mirne	M
Genus: *Papilio*		
Papilio polymnestor (Cramer, 1775)	Blue Mormon	W,S,M
Papilio polytes (Linnaeus, 1758)	Common Mormon	W,S,M
Papilio demoleus (Linnaeus, 1758)		M
Family: Nymphalidae		
Subfamily: Libytheinae		
Genus: *Libythea*		S,M
Libythea lepita (Moore, 1857)	Common Beak	S,M
Libythea myrrha (Godart, 1819)	Club Beak	
Subfamily: Danainae		
Genus: *Tirumala*		S,M
Tirumala septentrionis (Butler, 1874)	Dark Blue Tiger	W,M
Tirumala limniace Cramer, 1775	Blue Tiger	
Genus: *Danaus*		
Danaus chrysippus Linnaeus, 1758	Plain Tiger	W,S,M
Danaus genutia Cramer, 1779	Striped Tiger	W,S,M
Genus: *Euploea*		
Euploea core (Cramer, 1780)	Common Indian Crow	W,S,M
Genus: *Idea*		
Idea malabarica Moore, 1877	Malabar Tree Nymph	
Subfamily: Satyrinae		
Genus: *Mycalesis*		
Mycalesis anaxias Hewitson, 1862	Whitebar Bushbrown	S
Mycalesis oculus Marshall, 1880	Red-Disc Bushbrown	S,M
Genus: *Lethe*		
Lethe rohria (Fabricius, 1787)	Common Treebrown	M
Genus: *Ypthima*		
Ypthima baldus (Fabricius, 1775)	Common Fivering	W,S
Ypthima ceylonica Hewitson, 1865	White Fourring	W,S,M
Genus: *Orsotriaena*		
Orsotriaena medus (Fabricius, 1775)	Nigger	S,M
Genus: *Melanitis*		
Melanitis leda (Linnaeus, 1758)	Common Evening Brown	M
Subfamily Heliconiinae		
Genus: *Cirrochroa*		
Cirrochroa thais (Fabricius, 1787)	Tamil Yeoman	S
Genus: *Cupha*		
Cupha erymanthis (Drury, 1773)	Rustic	S
Subfamily: Acraeinae		
Genus: *Acraea*		
Acraea terpsicore (Linnaeus, 1758)	Tawny Coster	W,S,M
Subfamily: Limenitidinae		
Genus: *Pantoporia*		
Pantoporia hordonia (Stoll, 1790)	Common Lascar	S,M
Genus: *Neptis*		
Neptis hylas Linnaeus, 1758	Common Sailer	W,S,M
Neptis columella (Cramer, 1780)	Shortbanded Sailer	
Neptis jumbah Moore, 1857	Chestnut-Streaked Sailer	S,M
Subfamily: Biblidinae		
Genus: *Ariadne*		
Ariadne ariadne Linnaeus, 1763	Angled Castor	W,S
Ariadne merione (Cramer, 1777)	Common Castor	S,M
Subfamily: Nymphalinae		
Genus: *Vanessa*		
Vanessa indica (Herbst, 1794)	Indian Red Admiral	W,S
Vanessa cardui (Linnaeus, 1758)	Painted Lady	W,S

Genus: *Junonia*		
Junonia atlites (Linnaeus, 1763)	Gray Pansy	S,M
Junonia almana (Linnaeus, 1758)	Peacock Pansy	W,S,M
Junonia hierta (Fabricius, 1798)	Yellow Pansy	S
Junonia iphita (Cramer, 1779)	Chocolate Pansy	W,S,M
Junonia lemonias (Linnaeus, 1758)	Lemon Pansy	S,M
Junonia orithya (Linnaeus, 1758)	Blue Pansy	M
Genus: *Hypolimnas*		
Hypolimnas bolina (Linnaeus, 1758)	Great Eggfly	S,M
Hypolimnas misippus (Linnaeus, 1764)	Danaid Eggfly	S,M
Family: Pieridae		
Subfamily: Pierinae		
Genus: *Pieris*		
Pieris canidia Linnaeus, 1768	Indian Cabbage White	S,M
Genus: *Anaphaeis*		
Anaphaeis aurota Fabricius, 1793	Pioneer(Caper White)	W,S
Genus: *Ixias*		
Ixias marianne Cramer, 1779	White Orange Tip	M
Ixias pyrene Linnaeus, 1764	Yellow Orange Tip	S,M
Genus: *Delias*		
Delias eucharis Drury, 1773	Common Jezebel	M,S
Genus: *Appias*		
Appias wardii (Moore, 1884)	Lesser Albatross	S,M
Genus: *Leptosia*		
Leptosia nina Fabricius ,1793	Psyche	
Genus: *Hebomoia*		
Hebomoia glaucippe Linnaeus, 1758	Great Orange-Tip	W,S,M
Genus: *Colotis*		S,M
Colotis eucharis Fabricius, 1775	Plain Orange-Tip	M
Colotis danae (Fabricius, 1775)	Crimson-Tip	M
Genus: *Pareronia*		
Pareronia valeria (Cramer, 1776)	Common Wanderer	W,S
Subfamily Coliadinae		
Genus *Catopsilia*		
Catopsilia pomona Fabricius, 1775	Common Emigrant	S,M
Catopsilia pyranthe Latreille, 1758	Mottled Emigrant	S
Genus: *Eurema*		
Eurema brigitta Cramer, 1780	Small Grass Yellow	W
Eurema andersonii Moore	One-Spot Grass Yellow	M
Eurema hecabe Linnaeus, 1758	Common Grass Yellow	W,S,M
Eurema blanda Boisduval, 1836	Three-Spot Grass Yellow	M
Family: Lycaenidae		
Genus: *Castalius*		
Castalius rosimon Fabricius, 1775.	Common Pierrot	W,S,M
Genus: *Lampides*		
Lampides boeticus (Linnaeus, 1767)	Peablue	S,M
Genus: *Zizula*		
Zizula hylax (Fabricius 1775)	Tiny Grass Blue	M,W
Genus: *Acytolepis*		
Acytolepis puspa (Horsfield, 1828)	Common Hedge Blue	M
Genus: *Jamides*		
Jamides bochus Stoll, 1782	Dark Cerulean	M,W
Genus: *Caleta*		
Caleta caleta Hewitson, 1876	Angled Pierrot	M
Genus: *Anthene*		
Anthene emolus (Godart, 1823)	Ciliate Blue	S,M
Genus: *Loxura*		
Loxura atymnus (Cramer, 1782)	Yamfly	S,M
Genus: *Spindasis*		
Spindasis vulcanus (Fabricius, 1775)	Common Silverline	M
Family: Hesperiidae		
Genus: *Hasora*		
Hasora badra (Moore, 1857)	Common Awl	S
Genus *Halpe*		
Halpe homolea (Hewitson, 1868)	Indian Ace	S
Genus: *Suastus*		
Suastus gremius (Fabricius, 1798)	Indian Palm Bob	S
Genus: *Spialia*		
Spialia galba (Fabricius, 1793)	Indian Skipper	S,M

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