

STRUCTURE OF BUTTERFLY COMMUNITY OF ANAIKATTY HILLS, WESTERN GHATS

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ABSTRACT

The community structure of butterflies was studied in the dry deciduous, thorny forest of Anaikatty hills, Western Ghats. Pierid butterflies showed greater abundance, which may be due to the relatively greater abundance of Capparaceae and Caesalpinaceae plants in the area. More species of Nymphalid butterflies were recorded from the area than any other family. Six endemic species and eight protected species listed under the Wildlife (Protection) Act were recorded from the area. The butterfly community did not show much variation between the sampling locations. The conservation value of the whole area is highlighted.

KEYWORDS

Anaikatty, Butterflies, community, Dry deciduous, Nymphalidae, Pieridae, Western Ghats

The Western Ghats biodiversity hotspot harbours 331 species of butterflies. Most of the previous studies on butterflies in Western Ghats were on the diversity and seasonal pattern (Ugarte & Rodricks, 1960; Larsen, 1987a,b,c, 1988; Asaithambi, 1994). Butterflies are known to follow seasonal pattern of distribution (Kunte, 1997; Arun, 2000). The present study was conducted to record the butterfly community structure in the thorny dry deciduous habitat of Anaikatty hills and understand the representation of the Western Ghats butterfly fauna.

STUDY AREA

Anaikatty Hills (76°39'-79°47'E & 11°5'-11°31'N), which falls under the Nilgiri Biosphere Reserve, is located in the Anaikatty Reserve Forest in Coimbatore district of Tamil Nadu, India (Fig. 1). The area receives an average rainfall of 668mm per year recorded over the last 10 years. Maximum temperature varies from 29 to 37 degrees. Trees, such as *Albizia amara*, *Albizia lebbeck*, *Acacia leucophloea*, *Acacia polyacantha*, *Ziziphus mauritiana*, *Chloroxylon swietenia* and *Tamarindus indica* are the dominant trees in this area. Dominant shrubs are *Cassia auriculata*, *Cassia fistula*, *Capparis grandis*, *C. roxburghii*, *C. grandiflora*, *C. sepiaria*, *Flacourtia indica*, *Elaeodendron glaucam*, *Clausina heptaphylla*, *Randia dumetorum*, *Premna tomentosa* and *Pavetta indica*. *Lantana camara*, *Chromolaena odorata* and *Parthenium hysterophorus* are the prominent weeds in the open areas of the landscape.

METHODOLOGY

The method adopted for sampling butterflies was transect count popularly known as 'Pollard walk' following Moore (1975), Pollard *et al.* (1975), and Walpole and Sheldon (1999). All the butterflies observed on either side of the transect path up to 5m wide were counted, although some lycaenids and some hesperids were difficult to be identified in the field. These were caught by hand net and identified up to the species and released. We followed classification by Ackery (1984) and

Goankar (1996) that classify the butterflies into five major families.

Four separate transect paths were laid in the four physiognomically different natural vegetation of the landscape. Transects were surveyed twice in a month. One-kilometer distance was covered in one-hour duration during the sampling. Thus eight-hour observation was required for getting one month's data. The study period was between March 2002 and February 2003. The butterfly diversity data of the study area was compared with the Western Ghats butterfly fauna to know the efficiency of the sample and the representation of the Western Ghats butterflies from the study area.

The mean, standard deviation, minimum, maximum and coefficient of variation of butterfly abundance in four transects were analysed to know the butterfly abundance similarity and variation in different sampling locations. The relative abundance of the butterflies in the samples was also calculated.

RESULTS

Seventy-five species of butterflies were recorded during the study period (Table 1). Nymphalidae was the most species-rich family where as Pieridae formed the most abundant family (Table 2). The number of butterfly species observed fluctuated between 14 and 48 per month, and number of butterflies observed fluctuated between 136 and 3686 per month. The monthly mean abundance of butterflies did not vary much among transects (Table 3). The Common Gull (*Cepora nerissa*) (Relative abundance (RA) = 0.13) was the most dominant butterfly encountered in one year. Yellow Orange Tip (*Ixias pyrine*) (RA = 0.10), White Orange Tip (*Ixias maurianne*) (RA = 0.09) and Mottled Emigrant (*Catopsilia pyranthe*) (RA = 0.08) were the next three dominants. Pieridae was the most common family throughout the year followed by Nymphalidae and Papilionidae. All these three families showed an extraordinary peak between October and December.

The species recorded in Anaikatty hills formed 23% of the Western Ghats butterfly fauna with better representation for Papilionidae (63%) and Pieridae (42%) compared the other families. Anaikatty harbours six endemic species of butterflies. The endemism level varies from southern India to the Indian Subcontinent (Table 1). Two Schedule I species of Wildlife Protection Act, 1972 were recorded from the Anaikatty hills. Five Schedule II species and one Schedule IV species were also recorded from the study area. The butterfly community did not show significant variation in different transects (Table 3).

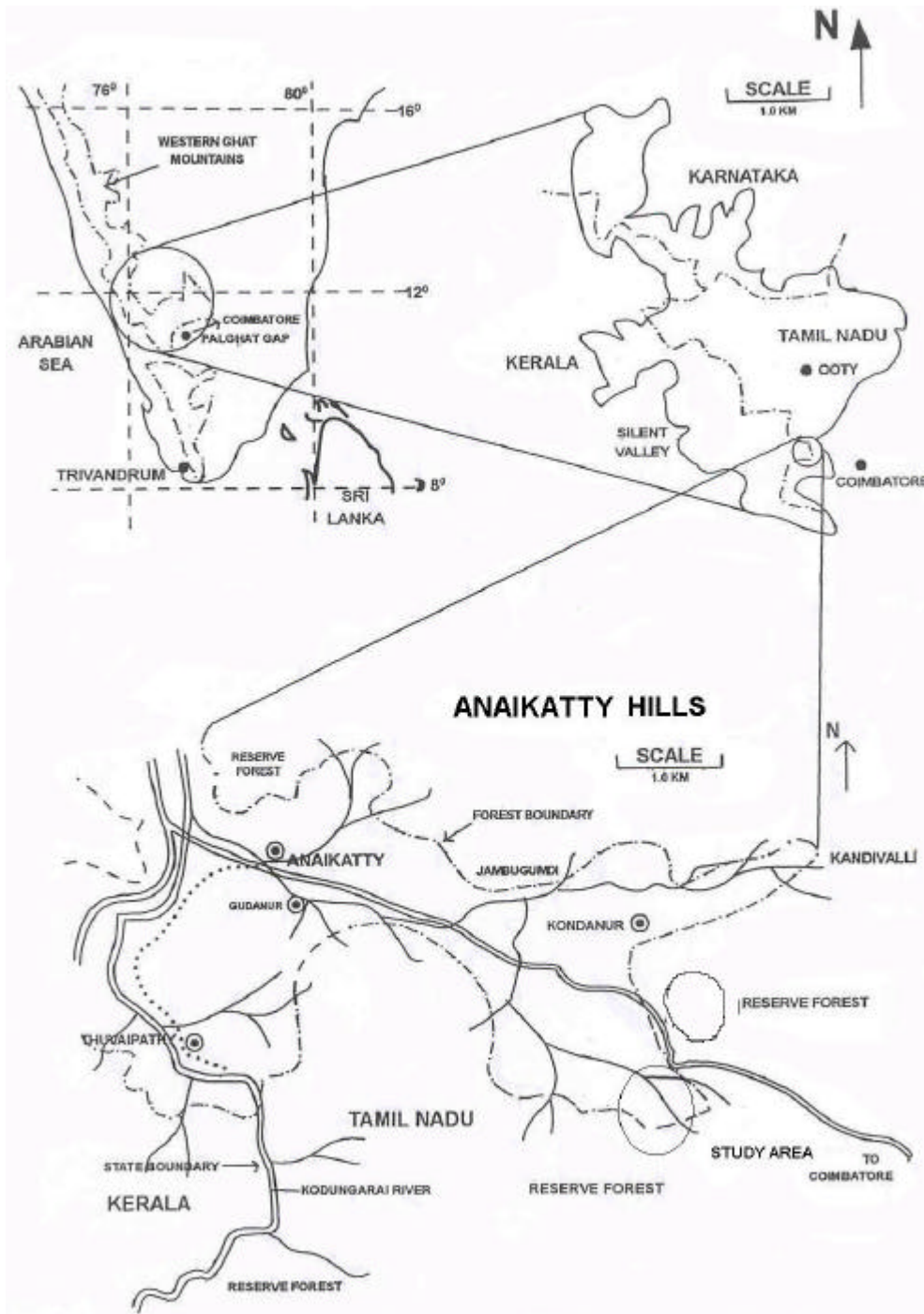


Figure 1. Location of the study area

Table 1. Checklist of butterflies in Anaikatty hills, Western Ghats

Common Name	Scientific Name	Endemic to	WPA, 1972	Common Name	Scientific Name	Endemic to	WPA, 1972																														
Papilionidae				49	Baronet	<i>Euthalia nais</i> Forster																															
1	Southern Bird Wing	<i>Troides minos</i> Cramer	SI, WG	50	Common Beak	<i>Libythea lepita</i> Moore	Sch II																														
2	Common Rose	<i>Pachliopta aristolochiae</i> Fabricius		51	Peacock Pansy	<i>Junonia almana</i> Linnaeus																															
3	Crimson Rose	<i>Pachliopta Hector</i> Linnaeus	SI, SL	52	Zebra Blue	<i>Leptotes plinius</i> Fabricius																															
4	Common Bluebottle	<i>Graphium sarpedon</i> Linnaeus		53	Tiny Grass Blue	<i>Zizula hylax</i> Fabricius																															
5	Tailed Jay	<i>Graphium agamemnon</i> Linnaeus		54	Gram Blue	<i>Euchrysops cnejus</i> Fabricius	Sch II																														
6	Spot Sword tail	<i>Graphium nomius</i> Esper		55	Pea Blue	<i>Lampides boeticus</i> Linnaeus																															
7	Lime Butterfly	<i>Papilio demoleus</i> Linnaeus		56	Common Cerulean	<i>Jamides celeno</i> Cramer																															
8	Common Mormon	<i>Papilio polytes</i> Linnaeus		57	Common Silverline	<i>Spindasis vulcanus</i> Fabricius	IS																														
9	Common Banded Peacock	<i>Papilio crino</i> Fabricius	PI, SL	58	Pale Grass Blue	<i>Pseudozizeeria maha</i> Kollar																															
10	Malabar Banded Peacock	<i>Papilio buddha</i> Westwood	WG	59	Lesser Grass Blue	<i>Zizinia otis</i> Fabricius																															
11	Blue Mormon	<i>Papilio polymnestor</i> Cramer	SL, PI	60	Grass Jewel	<i>Freyeria trochylus</i> Freyer																															
12	Red Helen	<i>Papilio helenus</i> Linnaeus		61	Plains Cupid	<i>Chilades pandava</i> Horsfield																															
Pieridae				62	Metallic Cerulean	<i>Jamides alecto</i> Felder																															
13	Common Emigrant	<i>Catopsilia pomona</i> Fabricius		63	Dark Cerulean	<i>Jamides bochus</i> Cramer																															
14	Mottled Emigrant	<i>Catopsilia pyranthe</i> Linnaeus		64	Common Pierrot	<i>Castalius rosimon</i> Fabricius																															
15	Common Grass Yellow	<i>Eurema hecabe</i> Linnaeus		65	Lime blue	<i>Chilades laius</i> Stoll																															
16	Common Jezebel	<i>Delias eucharis</i> Drury		66	Banded Blue Pierrot	<i>Discolampa ethion</i> Hewitson																															
17	Psyche	<i>Leposia nina</i> Fabricius		67	Rounded Pierrot	<i>Tarucus nara</i> Kollar																															
18	Common Gull	<i>Cepora nerissa</i> Fabricius	Sch II	68	Red Pierrot	<i>Telicada nyseus</i> Guerin-Meneville																															
19	Common Albatross	<i>Appias albina</i> Boisduval		69	Dark Grass Blue	<i>Zizeeria karsandra</i> Moore																															
20	White Orange Tip	<i>Ixias marianne</i> Cramer		70	Yam fly	<i>Loxura atymnus</i> Fruhstorfer																															
21	Common Wanderer	<i>Paretonia valeria</i> Cramer		Hesperiidae																																	
22	Yellow Orange Tip	<i>Ixias pyrene</i> Linnaeus		71	Fulvous Pied Flat	<i>Pseudocoladenia dan</i> Fabricius																															
23	Small Orange Tip	<i>Calotis etrida</i> Boisduval		72	Indian Skipper	<i>Spialia galba</i> Fabricius																															
24	Great Orange Tip	<i>Hebomoia glaucippe</i> Linnaeus		73	Brown Awl	<i>Badamia exclamatoris</i> Fabricius																															
25	Three-spot Grass Yellow	<i>Eurema blanda</i> Boisduval		74	Common Banded Awl	<i>Hasora chromus</i> Cramer																															
26	Crimson Tip	<i>Colotis danae</i> Fabricius		75	White Banded Awl	<i>Hasora taminatus</i> Hubner																															
Nymphalidae				SI - South India; WG - Western Ghats; PI - Peninsular India; IS - Indian Sub continent; SL - Sri Lanka; WPA - Wild Life Protection Act, 1972; Sch - Schedule																																	
27	Tawny Coster	<i>Acraea violae</i> Fabricius		Table 2. Butterfly diversity in Anaikatty Hills																																	
28	Common Leopard	<i>Phalanta phalantha</i> Drury		<table border="1"> <thead> <tr> <th>Family</th> <th>Species richness</th> <th>Abundance</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Pieridae</td> <td>14 (33)</td> <td>6170</td> </tr> <tr> <td>2</td> <td>Nymphalidae</td> <td>25 (96)</td> <td>4046</td> </tr> <tr> <td>3</td> <td>Papilionidae</td> <td>12 (19)</td> <td>1365</td> </tr> <tr> <td>4</td> <td>Lycaenidae</td> <td>19 (102)</td> <td>333</td> </tr> <tr> <td>5</td> <td>Hesperiidae</td> <td>5 (81)</td> <td>32</td> </tr> </tbody> </table>				Family	Species richness	Abundance	1	Pieridae	14 (33)	6170	2	Nymphalidae	25 (96)	4046	3	Papilionidae	12 (19)	1365	4	Lycaenidae	19 (102)	333	5	Hesperiidae	5 (81)	32							
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29	Common Sailer	<i>Neptis hylas</i> Moore		Parentheses indicate species richness of the family within Western Ghats.																																	
30	Common castor	<i>Ariadne merione</i> Cramer		Table 3. The mean abundance of butterflies per month in different transects																																	
31	Lemon Pansy	<i>Junonia lemonias</i> Linnaeus		<table border="1"> <thead> <tr> <th>Transect Number</th> <th>Mean/Month</th> <th>SD</th> <th>Min</th> <th>Max</th> <th>CV</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>222</td> <td>256</td> <td>24</td> <td>992</td> <td>1.15</td> </tr> <tr> <td>2</td> <td>266</td> <td>223</td> <td>27</td> <td>789</td> <td>0.84</td> </tr> <tr> <td>3</td> <td>231</td> <td>264</td> <td>30</td> <td>1010</td> <td>1.14</td> </tr> <tr> <td>4</td> <td>277</td> <td>304</td> <td>55</td> <td>931</td> <td>1.10</td> </tr> </tbody> </table>				Transect Number	Mean/Month	SD	Min	Max	CV	1	222	256	24	992	1.15	2	266	223	27	789	0.84	3	231	264	30	1010	1.14	4	277	304	55	931	1.10
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33	Plain Tiger	<i>Danaus chrysippus</i> Linnaeus																																			
34	Striped Tiger	<i>Danaus genutia</i> Cramer																																			
35	Common Indian Crow	<i>Euploea core</i> Cramer	Sch IV																																		
36	Tamil Yeoman	<i>Cirrochora thais</i> Fabricius																																			
37	Chocolate Pansy	<i>Precis iphita</i> Cramer																																			
38	Blue Pansy	<i>Junonia orithya</i> Linnaeus																																			
39	Yellow Pansy	<i>Junonia hierta</i> Fabricius																																			
40	Dark Blue Tiger	<i>Tirumala septentrionis</i> Butler																																			
41	White Four-ring	<i>Ypthima ceylonica</i> Hewitson																																			
42	Common Four Ring	<i>Ypthima baldus</i> Fabricius																																			
43	Great Eggfly	<i>Hypolimnas bolina</i> Linnaeus																																			
44	Common Nawab	<i>Polyura athamas</i> Drury																																			
45	Common Lascar	<i>Pantoporia hordonia</i> Stoll																																			
46	Double-banded Crow	<i>Euploea sylvester</i> Fabricius																																			
47	Common Map	<i>Cyrestis thyodamas</i> Boisduval																																			
48	Rustic	<i>Cupha erymanthis</i> Drury																																			

DISCUSSION

Family Nymphalidae representing the maximum number of species is observed true for the entire region. Earlier reports in the nearby moist deciduous forest in Siruvani (Arun, 2000) and in the evergreen forest of Silent Valley National Park (Mathew & Rahamathulla, 1993) indicated dominance of Nymphalidae in species richness. Pieridae represented maximum abundance of butterflies in the study area. However, it contradicts with the abundance of nymphalids observed in the evergreen forest of Siruvani hills (Arun, 2000). The reason for this extraordinary abundance of pierid butterflies in the study area can be ascribed to the dominance of their larval food plants in the region. Balasubramanian *et al.* (2001) reported the dominance of the plants belonging to the genus *Capparis*, *Cassia*, *Bauhinia*, *Albizia* in the study area, which are the food plants of pierid butterflies. One species, Common Gull (*Cepora nerissa*) makes all the difference in diversity patterns for Pieridae. Number fluctuations of other species are comparable with the dominant ones of other families. In Nymphalidae also the pattern looks similar with an exception of Dark Blue Tiger (*Tirumala septentrionis*), whose abundance peaked in October. In Papilionidae two *Papilio* species, *P. polytes* and *P. demoleus* showed similar trend by peaking in November. These minor differences may be due to the difference in their life history strategies, but to prove it more specific studies are needed.

Representation from the family HesperIIDae was very less compared to the proportion of Western Ghats hesperiid butterflies. It is partly due to the sampling bias, since hesperids exhibit crepuscular habit, i.e., they are active early morning and to a lesser extent, in the evening. They are also seen active in daytime under the shade of the jungle or out in the open during cloudy weather (Wynter-Blyth, 1957; Kunte, 2000). However, the sample data reflects the same trends in composition of species in various families of butterflies of Western Ghats.

We conclude that Anaikatty hills support a pierid dominated butterfly community. The butterfly diversity of the Anaikatty hills is similar to other parts of the Western Ghats reported earlier. The butterfly community did not show much variations between the sampling locations of the study area, hence the whole area can be considered as one unit while planning conservation measures. The fact that the study area harbours significant numbers of endemic and protected butterfly species, also highlight greater conservation importance of the area.

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