



## A study on butterfly population towards the conservation of biodiversity in Adukkam areas of Palani Hills in Western Ghats

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### Abstract

Adukkam areas is one of the tribal dominated area of Palani hills famous for Garasia tribes who are unique in their ethno cultural heritage, far from the modern civilization and mostly depend on the forest and forest produce for their livelihood including the other tribes. These tribes are most backward and live in the interior forest. Livelihood systems in the study area is complex. Agriculture and daily labour are the major source of livelihood. People in the area work as daily labourer but also visit nearby areas in absence of the labour opportunity. This area comes under dry deciduous forest, common species in natural forest include *Butea monosperma*, *Anogeissus latifolia*, *zizyphus* spp., *Azadirachta indica*, *Madhuca longifolia*, *Boswellia serrata*, *Manilkara hexandra*, *Diospyros melanoxylon*, *Phonix* spp., *Pithocellobium dulce*, *Annona squamosa* and *Miliusa tomentosa*. *Miliusa tomentosa* (Roxb.) J. Sinclair is commonly known as Hoom. It is a large deciduous tree, growing up to 20 m tall. The fruits are edible and the wood is used for making cots in the region. Fruits are given to children to build up stamina and is also used to cure respiratory disorders. During the study the survey has been done and this tree is observed as the larval host plant for the various species of butterflies.

The butterflies play an important role as the pollinator, carries pollen from one flower to another. Their larvae act as the pest, injurious to various crops. Present study was carried out at tribal dominated area of Adukkam area of Palani hills, during May 2022 to August 2022 to record the species composition of butterflies. During this study a total of 16 species and 04 families were reported. The reported families Nymphalidae covered 37.5 %, Papilionidae 31.25 %, Danaidae 12.5 % and Pieridae 18.75 % biodiversity of butterflies of the study area. In Nymphalidae included, *Junonia orithya*, *Junonia almana*, *Byblia ilithyia*, *Hypolimnas bolina*, *Hypolimnas misippus* and *Cynthia cardui*. In Papilionidae included *Graphium nomius*, *Graphium doson*, *Graphium Agamemnon*, *Graphium tereon* and *Charaxes psaphon*. In Danaidae included *Danaus chrysippus* and *Danaus genutia*. In Pieridae included *Cepora nerissa*, *Catopsilia crocale* and *Colotis etrida*. Species diversity index (H') was highest (0.425) in case of family Nymphalidae compared to other. It is suggested that butterfly species diversity generally increases with increase in vegetation and declines with the increase in disturbance. A detail study is required for further exploration of butterfly fauna of tribal dominated area of Adukkam area of Western Ghats.

**Keywords:** study, butterfly, population, biodiversity

### Introduction

The 1.4 million species on the earth planet, over 53% are insects, while about 15,000-16,000 species of butterflies are known worldwide (Hassan, 1994). Lepidoptera is one of the most wide spread and widely recognizable insect orders in the world. The term was coined by Linnaeus in 1735 and is derived from Ancient Greek (scale) and wing. Linnaeus in *Systema Naturae* (1758) recognized three divisions of the Lepidoptera: Papilio, Sphinx and Phalaena, with seven subgroups in Phalaena (Perveen and Ahmed, 2012). Butterflies are the most brightly colored insects belonging to order Lepidoptera of class insecta and it is the second largest order after Coleoptera. Adults of many Lepidopterans are most efficient pollinators as they suck the sap of Nectar by sucking mouth parts, while the caterpillars of many Lepidopterans defoliate various types of plants and causing severe damages to them (Kumar *et al.* 2013) [8]. Butterflies are the good indicators of environmental quality (Uniyal and Mathur, 1998; Dennis and Hardy, 2001) [3]. Changes in abundance and distribution of butterflies have been linked to a range of factors, including habitat loss and fragmentation; land use and climate change (Asher *et al.*

2001) [2]. Some species appear to be benefitting from climate warming and have expanded in both range and abundance (Fox *et al.* 2007) [4]. Species that use aposematism as an anti-predator strategy are expected to be monomorphic for colour pattern, in order to facilitate avoidance learning by predators; if the aposematic prey is polymorphic, naïve predators will need to experience every colour form independently (Kumar *et al.* 2013) [8]. The Queen butterfly, *Danaus chrysippus* is a nymphalid butterfly which belongs to the subfamily Danainae. It is widely distributed throughout the old world tropics and subtropics. It is found in all habitats including deserts and mountains. However, it is primarily an open country butterfly (Kumar *et al.* 2013) [8]. The species is well adapted to human disturbance (Owen, 1970) [14], since it is most abundant in human made habitats such as farms, gardens, waste land and roadsides. *Danaus chrysippus* does not form discrete populations and the long-lived adults range widely in search of nectar, pyrrolizidine alkaloid sources, mates and food-plants (Kumar *et al.* 2013) [8]. Moreover, it is a migratory butterfly which undergoes both short term and long-term movements (Smith & Owen, 1997) [14]. Biological diversity

is now increasingly recognized as a vital parameter to assess global and local environmental changes and sustainability of developmental activities. However, a systematic study of invertebrates particularly butterflies has not been carried out from the Abu road region. Vaghela *et al.*, 2013<sup>[16]</sup> studied the Diversity Pattern of Butterfly Communities (Lepidoptera) at Mangrol Region of Kathiawar Peninsula, India, but there is no report on the diversity and status of butterfly species in the rest of the Tamilnadu region. Therefore, in the present investigation an attempt has been made to study the diversity and status of butterfly fauna in tribal dominated area of Adukkam area, Kodaikanal, Western ghats. *Milium tomentosum* is commonly known as Hoom and in local language Umbiya. It is a large deciduous tree, growing up to 20 m tall. Bark is blackish brown. Leaves are thick leathery, ovate, oblong, 4-10 cm long, 2-5.5 cm broad, smooth above, softly hairy below, base rounded, margin entire, tip pointed, leaf-stalk 2-5 mm. Flowers are greenish, 1.5 cm across, solitary or in pairs opposite the leaf. Sepals are about 4 mm long, linear-lance shaped. Petals are 3+3, about 6 mm long, outer petals sepal-like, inner ones oblong to obovate. Fruits are dark purple, nearly spherical, 8-17 arranged in a ring, 2-3 cm across, stalk 1-1.5 cm long, seeds 3-4. Hoom is found in Rajasthan, Bihar, Odisha, Karnataka, Tamil Nadu, Maharashtra, Nepal and Srilanka. Flowering: May-August.

## Materials and methods

### Collection sites

The samples were collected from tribal dominated area of Adukkam Hills located in Kodaikkanal, Southern Part of Western ghats during survey made at May 2022 to August 2022.

### Collection of samples

Adult butterflies were collected from the selected area by using a Pollard Walk Methods. Butterflies were identified in the field using field guides by Wynter-Blyth (1957)<sup>[17]</sup>, Kunte (2000)<sup>[9]</sup>, Kehimkar (2008)<sup>[18]</sup> and followed classification given by Gaonkar (1996)<sup>[5]</sup>. The species and seasonal diversity has been calculated by using "Shannon Wiener index".

## Result and Discussion

During the present study a total of 50 individuals belonging to 16 species and 04 families were reported, out of 04 families, Nymphalidae was the most dominant family in terms of number of species and represented by 6 species followed by Papilionidae (5 species), Pieridae (3 species), and Danaidae (2 species) (Table 1 & 2, Pg.-7). In terms of number of individuals the family Nymphalidae was most dominant followed by Papilionidae, Pieridae and Danaidae (Table 2, Pg.-7).

Gilbert and Singer (1975)<sup>[6]</sup> have pointed out the availability of larval as well as adult food resources as a limiting factor in the occurrence and migration of butterflies.

Five species are listed in the Wildlife (Protection) Act, 1972 (Anonymous, 1990)<sup>[1]</sup> with each two species in Schedule I and II and one species in Schedule IV. Danaid eggfly (*Hypolimnas misippus*) is listed in Schedule I and II. In the present study Danaid egg fly recorded very rarely during the study period, while Blue Pansy (*Junonia orithya*), Great Egg fly (*Hypolimnas bolina*), Tailed jay (*Graphium*

*agamemnon*), Common Jay (*Graphium doson*), Common Emigrant (*Catopsiliacrocale*) and Small Orange Tip (*Colotis etrida*) are occurred common in the sampling area (Table 1). Vaghela *et al.*, 2013<sup>[16]</sup> has carried out studies on Diversity Pattern of Butterfly Communities in Mangrol Region of Kodaikanal district, Tamilnadu, India.

It is also reported in determining the pattern of butterfly community, relative abundance of butterfly and plants resources was an important aspect that characterizes butterfly community (Yamamoto *et al.* 2007)<sup>[18]</sup>. There was evidence that related groups of butterfly species associated with particular plants (as larva host plants or imago food plants) and that phenomenon was also found by Queiroz (2002)<sup>[13]</sup>.

**Table 1:** Taxonomic composition of Butterflies recorded from the study area. (Abbreviations: A – abundant, C- common, R- rare)

S. No.	Taxonomic composition	Common name	Status
<b>Family Nymphalidae</b>			
1.	<i>Junonia orithya</i> (Linnaeus 1758)	Blue Pansy	C
2.	<i>Junonia almana</i> (Linnaeus 1758)	Peacock Pansy	C
3.	<i>Byblia lithyia</i> (Drury 1773)	Joker	R
4.	<i>Hypolimnas bolina</i> (Linnaeus 1758)	Great Eggfly	C
5.	<i>Hypolimnas misippus</i> (Linnaeus 1758)	Danaid Eggfly	R
6.	<i>Cynthia cardui</i> (Linnaeus 1758)	Painted Lady C	C
<b>Family- Papilionidae</b>			
7.	<i>Graphium agamemnon</i>	Tailed Jay or Green-spotted Triangle	C
8.	<i>Graphium doson</i>	Common Jay	C
9.	<i>Graphium nomius</i>	Spot Sword tail	C
10.	<i>Graphium terebon</i>	Narrow-banded Bluebottle	C
11.	<i>Charaxes psaphon</i>	Plain Tawny Rajah	R
<b>Family- Pieridae</b>			
12.	<i>Cepora nerissa</i> (Fabricius 1775)	Common Gull	R
13.	<i>Catopsilia crocale</i> (Cramer 1775)	Common Emigrant	C
14.	<i>Colotis etrida</i> (Boisduval 1836)	Small Orange Tip	C
<b>Family Danaidae</b>			
15.	<i>Danaus chrysippus</i> (Linnaeus 1758)	Plain tiger	A
16.	<i>Danaus genutia</i> (Cramer 1779)	Striped Tiger	C

**Table 2:** Relative abundance, species composition and species diversity of Butterflies recorded from selected sampling site during the study period.

S. No.	Family	No. of species	% of species	Species Diversity (H')
1.	<i>Nymphalidae</i>	06	37.5	0.425
2.	<i>Papilionidae</i>	05	31.25	0.505
3.	<i>Pieridae</i>	03	18.75	0.472
4.	<i>Danidae</i>	02	12.5	0.903
	Total	16	100	2.305

## Conclusion

From above study it was concluded that the Nymphalidae was the most dominant family in terms of number of species followed by Papilionidae, Pieridae and Danaidae, while in terms of number of individuals the family Pieridae was most dominant followed by Nymphalidae, Papilionidae and Danaidae.

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