

The Butterfly (Insecta: Lepidoptera) Diversity of Unakoti Hill: An Important Sacred Grove of Tripura, North East India

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Abstract

Field study was made to record the diversity of butterflies of Unakoti hill, Tripura during May, 2017 to June, 2020. A total of 42 species belonging to 6 families were observed which accounts for about 20% of the species recorded from Tripura. The family Nymphalidae dominated with a highest number of species. The diversity of the species of butterfly will serve as a good indication of the health of the environment in and around of this sacred grove. Thus, the present investigation provides insight into the butterflies of Unakoti hill, Tripura and has instigated further research on forest habitat and ecotourism in the study area.

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Received: 03/10/2020
Accepted: 24/12/2020

Keywords: Butterfly, Species diversity, Nymphalidae, Sacred grove, Unakoti hill, Tripura.

1. Introduction

Systematic documentation of butterfly diversity and it's important to the environments have been studied in different parts of the world since the turn of the 18th century. Among insects, butterflies are unquestionably the most popular and best-known group as they are one of the most amazing and magnificent elements of biodiversity (Ghazoul, 2002). Their occurrence and characteristics provide crucial information about environmental quality of a particular region of ecosystems as they are sensitive to minute level of ecological changes. Butterflies are popularly known as 'flagship' species, which act as surrogates for diversity studies around the world (Williams, 1930), because of their important role in environmental monitoring system under terrestrial ecosystems. Changes in abundance and distribution of butterflies have been linked to a range of factors, including habitat loss and fragmentation, land use and climate changes (Abideen *et al.*, 2015; Thomas *et al.*, 1998).

It has been noticed that biodiversity conservation efforts in local community level through the establishment of sacred groves in many parts of the world including India (Gaude and Janarthanam, 2015; Ojianwuna and Amusan, 2019; Beatrice *et al.*, 2012; Singh *et al.*, 2017; Khan *et al.*, 2008). Sacred groves are usually virgin forest with multi diversity that has been protected by the local people for a very long time as a part of their cultural and religious practices (Onyekwelu and Olusola, 2014). In some regions in this country, sacred groves represent possibly the merely remaining examples of old forest vegetation which maintain rare and endangered species of both plant and animals. As such many of the groves are described as "biodiversity hotspots" (Myers *et al.*, 2000). As a result, these sacred groves clearly be worthy of conservation attention and this is necessitated

by the declining cultural practices and the increase pressure for modern agricultural practices.

Being a mega biodiversity country, India hosts 1,501 species of butterflies (Gaonkar, 1996). Northeast India is one of the most significant hotspot of biological diversity including butterflies. The diverse habitats and topography are the major influence on the butterfly availability in Eastern Himalayan region (Mani, 1986). The large volume of information existing in concern of certain aspects of butterflies of North East- India, among these major records are available for the Arunachal Pradesh and Assam only (Doherty, 1889; Betts, 1950; Cantlie, 1952; Saikia and Saikia, 2014; Saikia, 2011; Gupta and Shukla, 1988) and a few number of studies are accessible for Tripura province of northeast India, situated in the western fringe of the Indo-Myanmar biodiversity hotspot (Mondal *et al.*, 2002; Lodh and Agarwala, 2015; Lodh and Agarwala, 2016; Agarwala *et al.*, 2010; Majumder *et al.*, 2012; Majumder *et al.*, 2013; Das, 2017; Bhowmik *et al.*, 2020). But till date no detail study report is available on butterfly diversity in relationship to any particular sacred grove of the Tripura state, North East India.

2. Methodology

The study area is located within Kailashahar subdivision under Unakoti district of Tripura, a part of the western fringe of the Indo-Burma biodiversity hotspot. The vegetation complex of the area is characterized by dry-deciduous secondary forest, patches of bamboo and scattered plants. The study area having riparian ecosystem, tropical climate, with four distinct seasons: winter (late November to February), summer (March to May), monsoon (June to September) and autumn (October to November). The temperature ranging from 10^oC-35^oC and experiences an average annual rainfall from 2000-2500 mm. The study site –

Table 1: Lists of butterfly species found during study period in the Unakoti hill, Kailashahar, Tripura

Family	SL. No.	Common Name	Scientific Name
PAPILIONIDAE	1	Lime Swallowtail	<i>Papilio demoleus</i>
	2	Great Mormon	<i>Papilio memnon</i>
	3	Common Mormon	<i>Papilio polytes</i>
	4	Yellow Helen	<i>Papilio nephelus</i>
	5	Common Birdwing	<i>Troides helena</i>
PIERIDAE	6	Lemon Emigrant	<i>Catopsilia pomona</i>
	7	Three-spot Grass Yellow	<i>Eurema blanda</i>
	8	Red-base Jezebel	<i>Delias pasithoe</i>
	9	Psyche	<i>Leptosia nina</i>
	10	Red-spot Jezebel	<i>Delias descombesi</i>
	11	Painted Jezebel	<i>Delias hyparete</i>
	12	Indian Cabbage White	<i>Pieris canidia</i>
	13	Common Albatross	<i>Appias albina</i>
NYMPHALIDAE	14	Plain Tiger	<i>Danaus chrysippus</i>
	15	Common lascar	<i>Pantoporia hordonia</i>
	16	Knight	<i>Lebadea martha</i>
	17	Common Crow	<i>Euploea core</i>
	18	Nigger	<i>Orsotriaena medus</i>
	19	Common sergeant	<i>Athyma perius</i>
	20	Common Palmfly	<i>Elymnias hypermnestra</i>
	21	Common Evening Brown	<i>Melanitis leda</i>
	22	Peacock Pansy	<i>Junonia almana</i>
	23	Grey Pansy	<i>Junonia atlites</i>
	24	Yellow Pansy	<i>Junonia hierta</i>
	25	Common Leopard	<i>Phalanta phalantha</i>
	26	Glassy Tiger	<i>Parantica aglea</i>
LYCAENIDAE	27	Mandarin blue	<i>Charana mandarinus</i>
	28	Common Red Flash	<i>Rapala iarbus</i>
	29	Slate Flash	<i>Rapala manea</i>
	30	Common Gem	<i>Poritia hewitsoni</i>
	31	Copper Flash	<i>Rapala pheretima</i>
	32	Purple Sapphire	<i>Heliophorus epicles</i>
	33	Forget-me-not	<i>Catochrysops strabo</i>
	34	Common Pierrot	<i>Castalius rosimon</i>
	35	Peacock Royal	<i>Tajuria cippus</i>
	36	Lesser Grass blue	<i>Zizina otis</i>
	HESPERIDAE	37	Common snow flat
38		Chestnut bob	<i>Iambrix salsala</i>
39		Continental swift	<i>Parnara ganga</i>
40		Smaller dartlet	<i>Oriens goloides</i>
41		Grass demon	<i>Udaspes folus</i>
RIODINIDAE	42	Punchinello	<i>Zemeros flegyas</i>

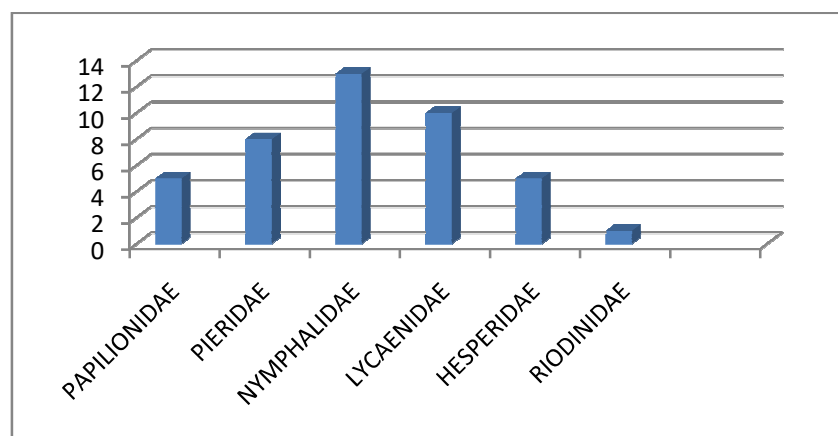
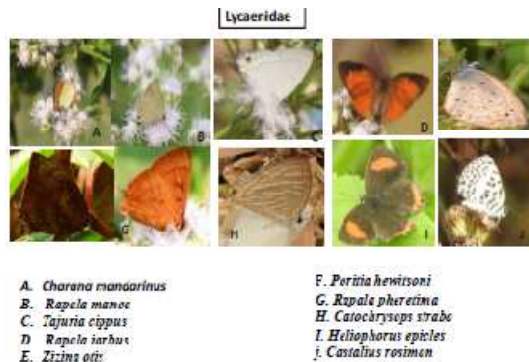
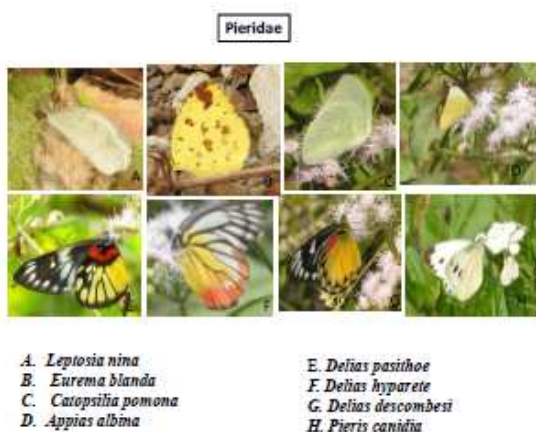
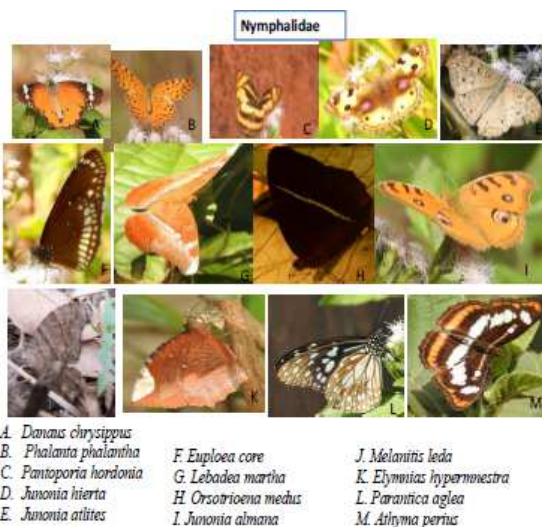


Fig 1: Representation of family-wise species composition status in the study area

include one of the most important ecotourism destination in northeast India because of the highly mutilated loose sculptures, some temple architectural members and traces of ancient brick temple on the top of the hillock and also attract for religious activities most of times of the years and harbour a good number of butterfly species, which plays a key role in pollination of various flowering plants.

Field survey was carried out during May, 2017 to June, 2020 from 8.00h to 12.00h and 14.00h to 18.00h and butterflies were photographed with the help of high resolution digital camera (NIKKON COOPIX P610) and ASUS ZENPHONE 3 MAX for the taxonomic purpose. Identification at the species level was confirmed by following field guides (Kunte, 2000; Kehimkar, 2008; Kunte *et al.*, 2020).



3. Results and Discussion

A total of 42 species were recorded in this study. This comprised of 6 families (Table 1). Nymphalidae was the highest in terms of species richness (30.96%) while Riodinidae had the least percentage of species (Fig 1).

The Indian subcontinent hosts about 1501 species of butterflies. The exact status of butterflies of Northeast India particularly of Tripura is still not clearly known due to lack of extensive study. The

details study of Lodh and Agarwala (2015) recorded 212 butterfly species for Tripura province. In the present study, it has been observed that approximately 20% of the total butterflies documented in Tripura have been found in this sacred grove. The species viz. *Papilio demoleus*, *Delias hyparete*, *Euploea core*, *Junonia almana* are commonly noticeable in the study area. The diversity and abundance of butterfly species highly correlated with the availability of food resources (Kunte, 2000).

The high number of species richness may be attributed to the presence of so many perennial springs within study area which served as source of water within the grove. In addition, the heterogeneous complexity of the habitat structure in the Unakoti Hill supports lower story and undergrowth vegetation, variety of patches, mud's and sands with minerals. All these are potential ecological factors for butterflies and thus could have been responsible for butterfly richness in the grove. The interesting finding of the present study is that most of the species visit to *Chromolaena odorata* (Asteraceae), is an invasive species due to its floral characteristics and important nectar source

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particularly during dry season. On the basis of the present study it can be presumed that Unakoti Hill is an array of micro habitat which harbours a large number of butterfly species and less anthropogenic pressure in the study area in compare to other parts of the state.

4. Conclusion

The present study of the butterfly fauna of Unakoti Hill clearly indicates that the sacred grove is potential biodiversity hotspot. A small area support a good number of butterfly species, therefore more extensive inventory survey is to be require to documentation of more species. Integrated approach to the management of this sacred grove by involving of all stakeholder is utmost important.

Acknowledgement

The author is thankful to college authority of Ramkrishna Mahavidyalaya, Kailashahar, Tripura for providing necessary facility and encourage to carry out the research work.

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