IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)
e-ISSN: 2319-2402,p- ISSN: 2319-2399.Volume 14, Issue 10 Ser. II (October 2020), PP 55-60
www.iosrjournals.org

A Study on Butterfly Diversity And Related Host Plants in Joychandi Hill of Purulia District, West Bengal, India.

Soham Chowdhury[1] and Samir Kumar Chowdhury[2]
[1] *UG Student, Dept. Of Zoology, Bankura Sammilani College, Bankura, West Bengal, India*
[2] *M.Sc. B.Ed. Assistant Teacher, Panchakote Raj High School (H.S.), Purulia, West Bengal, India*

Abstract
Butterflies have always attracted attention due to their unique coloration and have played a pivotal role in the ecosystem. The present study reveals the diversity, abundance and host plant of butterfly species at Joychandi hill region of Purulia district. The study reflects that there are 33 butterfly species in this regions belonging to 5 families. Family Nymphailidae (45.45%) are dominant with 15 no of species. During monsoon and post-monsoon, butterflies are found in highest numbers.
Keywords*: Butterfly diversity, Host plant, Joychandi Hill*

Date of Submission: 09-10-2020 Date of Acceptance: 24-10-2020

I. Introduction

Butterfly plays important role in stability of food webs as herbivores (Rusman et al., 2016), pollinators (Atmowidi et al., 2007; Mukherjee et al., 2015), host of parasitoids (van Nouhuys & Hanski 2002) and prey of predators (Hammond & Miller 1998; Rusman et al., 2016). Butterflies are indicator taxa in terms of habitat quality and anthropogenic disturbance (Kocher and Williams 2000) and can be very sensitive to habitat fragmentation and climate change (Kunte 2000). More than 18,000 butterfly species have been documented worldwide (Heppner 1998; Martinez et al., 2003; Larsen et al., 2011) including 1,311 species reported from India (Varshney and Smetacek 2015). Over the last few decades, anthropogenic activities and climatic changes have negatively influenced butterfly diversity (Clark et al., 2007; Di Mauro et al., 2007).

Joychandi Hill of Purulia district is an adobe of various butterflies. In this context, an effort has been made to study the butterfly species in this area. There are only a few reports available till date about butterfly diversity of the entire lower Chotanagpur Plateau region.

Objectives of the study:
An effort has been taken to focus on the following objectives through the present study.
1. To focus on the geographical position of the study area.
2. To analyze butterfly diversity of the selected study area.
3. To study the different host plants present in the study area.

Observation Period:
The present study has been conducted for two consecutive years (March 2018- September 2020) throughout four season summer (March to May), monsoon (June to August), post-monsoon (September to November) and winter (December to February). Observations were made between 8.00 am and 4.30pm in a sunny weather. Daily observation periods varied in different seasons.

Study area:
Joychandi hill belongs to Chotanagpur Plateau of western part of West Bengal, situated two kilometers from the subdivisional town of Raghunathpur and four kilometers from Adra rail town. Covered with light jungle and grass bushes. It attracts tourists for Chandi temple and Hanuman temple on the hilltop and rock climbing is major attraction in winter. Joychandi hill was familiar as 'hanging pahar' during the reign of Panchokot raj of Kashipur. Basically it is a combination of Joychandi , Kalipahari and Jugtila hills.
The observed region is divided into two areas i.e.
Site 1- East face of Joychandi hill opposite of mela ground.
Site 2- West face of the hill behind yuva abason.
Site 3- kalipahari

Fig.1- location and satellite view of study area

Fig.2- From left to right- Site i, Site ii & Site iii

Physiographical Profile:

Area(in sq.mile)	0.9 square km (nearly)
Altitude	Maximum 155 m above MSL
Latitude	23.55°N 86.67°E
Temperature(^{0}C) Summer Winter	 43^{0}C 12^{0}C
Rainfall(cm)	1100mm
Humidity	50-60%
Landscape	Low hill, highland
Soil Type	Laterite, gravel mixed red soil
Vegetation type	Dry deciduous type [predominated by *Butea monosperma, Borassus flabellifer, Zyzypus sp., Ipomea sp., Calotropis procera, Euphorbia hirta, Cyperus rotundus, Solanum nigrum, Cynodon dactylon, Dactyloctenium aegypticum, Pannicum antidotale and Saccharum spontane*]

https://www.accuweather.com/

Data collection:

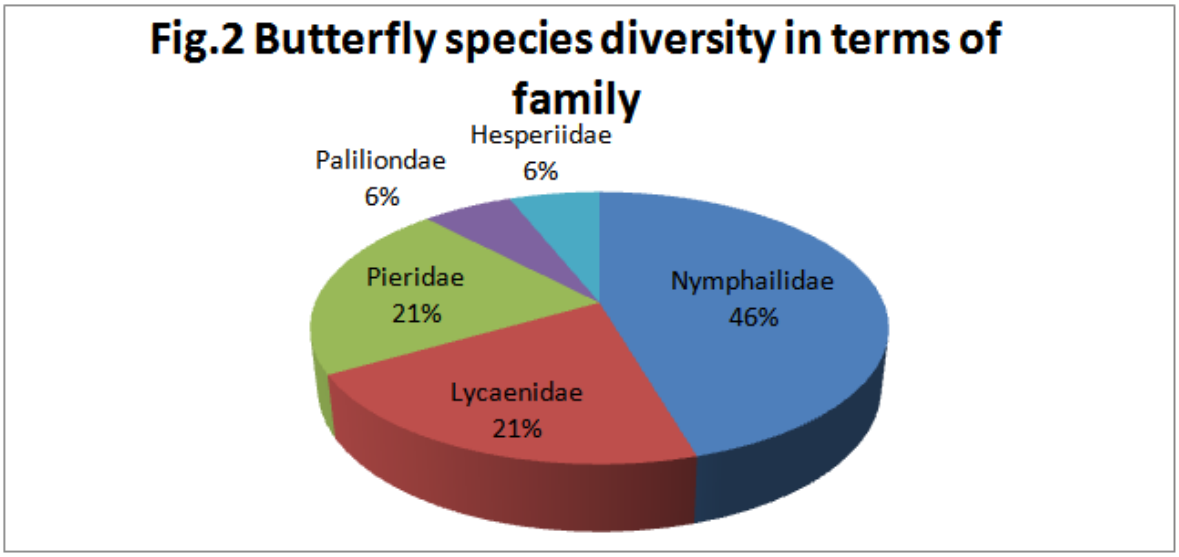
The study is mainly based on primary and secondary data sources. For primary data, butterfly species have been observed and recorded directly in the field. Different research papers, wikipedia, different books, internet access have been used as secondary sources. Regular field trips were made throughout this period. A combination of direct search technique (Sutherland 1996) and opportunistic sighting methods were conducted for two consecutive years to record butterfly diversity and abundance. Butterflies were photographed using digital camera (Nikon D7200 with 70-300mm lens) and identified using suitable keys (Evans 1932; Wynter-Blyth 1957; Haribal 1992; Kunte 2000; Kehimkar 2008). In critical conditions when identification was not possible by naked eye or could not be photographed, cryptic butterflies were captured by hand net with least disturbance, identified and released in the same habitat. Check list of identified butterfly was carried out using Microsoft Office Excel, 2007.

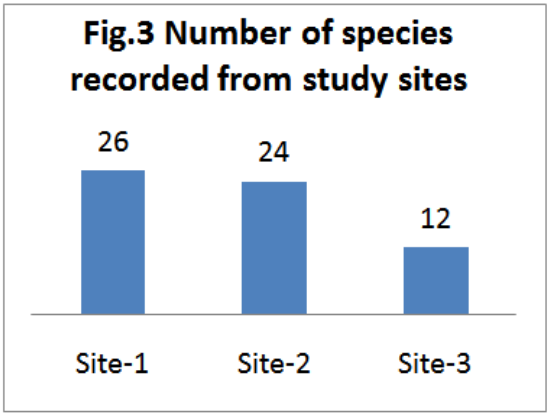
II. Result and Discussion:

Species diversity is a measurement of an ecosystem's species richness and species evenness. More species richness contributes to increase in biodiversity, which is an important aspect on biodiversity conservation.

The checklist of observed butterfly species in Joychandi Hill along with their family, common name, scientific name, host plant, observation site, observation season and visibility are given in **Table 1**. In total, 33 species of butterflies belonging to 5 families have been observed. Out of total 33 butterfly species, 26 species are recorded from site-1, 24 species are recorded from site-2 and 12 species are recorded from site-3 **(Fig 3)**. Family Nymphailidae (45.45%) are dominant with 15 no of species, followed by Lycaenidae (21.21%) with 7 species; Pieridae (21.21%) with 7 species; Palilionidae (6.06%) with 2 species and and Hesperiidae (6.06%) with 2 species **(Fig.2)**.

Butterflies have been found to be more abundant during monsoon (25 species) and post-monsoon (27 species) seasons compared to summer (17 species) and winter (21 species) **(Fig.5).** It might be due to extreme climatic conditions of this region. Summer and winter are very dry with very little rainfall which leads to shortage of the availability of nectar and larval food plants during these two seasons. According to visibility 15 species are wide spread, 10 species are common and 8 species are rare **(Fig.4).**





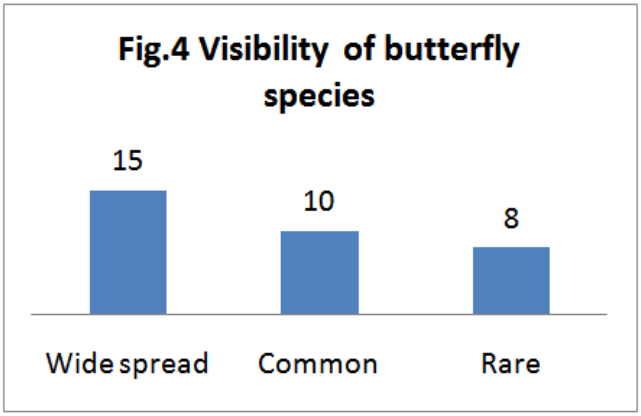
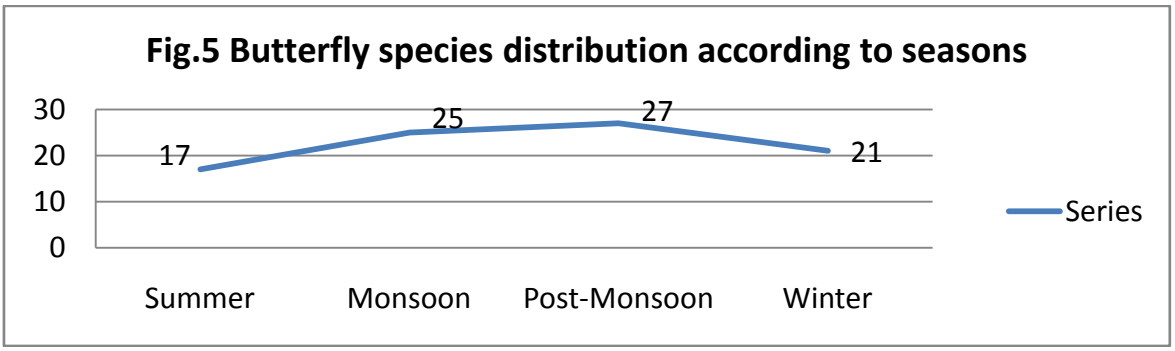


Table 1

Common Name	Scientific Name	Host Plant	Site	Season	Visibility
Family: Pieridae					
Common emigrant	*Catopsilia Pomona*	*Cassia sp.*	Site-1,2,3	1,2,3,4	W
Common gull	*Cepora nerissa*	*Cadaba sp.*	Site-1	2	C
Mottled emigrant	*Catopsilia pyranthe*	*Cassia sp., Senna sp.*	Site-1,2,3	1,2	C
One-spot grass yellow	*Eurema andersoni*	*Chromolaena sp.*	Site-1,2	2,3	C
Common grass yellow	*Eurema hecabe*	*Cassia sp.*	Site-1,2,3	1,2,3,4	W
Bengal albatross	*Appias olferna*	*Bidnes sp.*	Site-1	3	R
Common jezebel	*Delias eucharis*	*Dendrophthoe sp.*	Site-1,2	1,3	C
Family: Lycaenidae					
Common pierrot	*Castalius rosimon*	*Zizyphus sp.*	Site-1,2,3	2,3,4	W
Common red flash	*Rapala airbus*	*Ougeinia sp., Melastoma sp.*	Site-2	4	R
Slate flash	*Rapala manea*	*Combretum sp.*	Site-1	2,3	R
Pale grass blue	*Pseudozizeeria maha*	*Oxalis sp.*	Site-1,2	1,2,3,4	W
Pea blue	*Lampides boeticus*	*Butea sp. Pisum sp., Crotalaria sp.*	Site-1,2	1,2,3,4	C
Plains Cupid	*Luthrodes pandava*	*Acacia sp., Caesalpinia sp.*	Site-1,2,3	2,3,4	C
Common hedge blue	*Acytolepis puspa*	*Paracalyx sp., Peltophorum sp.*	Site-1	2,3,4	C
Family: Hesperiidae					
Paintbrush swift	*Baoris farri*	*Bambusa sp.*	Site-1	1,4	C
Palm bob	*Suastus gremius*	*Arecastrum sp., Borassus sp.*	Site-3	2,3	C
Family: Paliliondae					
Common mormon	*Papilio polytes*	*Murraya sp.*	Site-1,2,3	1,2,3,4	W
Tailed jay	*Graphium Agamemnon*	*Polyalthia sp., Michelia sp.*	Site-1	2	C
Family: Nymphalidae					
Lemon pansy	*Junonia lemonias*	*Barleria sp. , Hygrophilia sp.*	Site-1,2,3	1,2,3,4	W
Common castor	*Ariadne merione*	*Tragia sp.*	Site-1	2	R
Common crow	*Euploea core*	*Nerium sp.*	Site-1,2,3	1,2,3,4	W
Plain tiger	*Danaus chrysippus*	*Calotropis sp., Asclepias sp.*	Site-1,2,3	1,2,3,4	W
Baronet	*Euthalia nais*	*Shorea sp., Diospyros sp.*	Site-1,2	1,2,3,4	W
Blue tiger	*Tirumala limniace*	*Plumbago sp.*	Site-1,2,3	1,2,3,4	W
Common tiger	*Danaus genutia*	*Danaus genutia*	Site-1,2	1,2,3,4	W
Chocolate pansy	*Junonia iphita*	*Carvia sp.*	Site-1,2	1,2,3,4	W
Grey pansy	*Junonia atlites*	*Barleria sp., Hygrophilia sp.*	Site-2	1,2,3,4	W
Common evening brown	*Melanitis leda*	*Oryza sp.*	Site-2	2,3,4	W
Painted lady	*Vanessa cardui*	*Barleria sp., Hygrophila sp.*	Site-2	3	R
Common nawab	*Polyura athamas*	*Caesalpinia sp., Delonix sp.*	Site-2	1,3,4	R
Tawny coster	*Acraea terpsicore*	*Aporosa sp., Modecca sp.,*	Site-1,2,3	2,3,4	W
Common eggfly	*Hypolimnas bolina*	*Pseuderanthemum sp.*	Site-2	3	R

Common bushbrown	*Mycalesis perseus*	*Heteropogon sp., Dichanthium sp.*	Site-1	3	R

1= Summer (March to May), 2= Monsoon (June to August), 3= Post-monsoon (September to November), 4= Winter(December to February); W= Widespread, C= Common, R= Rare



A- Bengal albatross, B- Common pierrot, C- Blue tiger, D- Common crow, E- Lemon pansy, F- Slate flash, G- Tailed jay, H- Painted lady, I- Plain tiger, J- Grey pansy, K- Mottled emigrant, L- Common jezebel, M- Plam bob, N- Common mormon, O- Plains cupid, P- Common eggfly, Q- Common bushbrown, R- Pale grass blue, S- Common grass yellow

III. Conclusion

Present study reveals that butterflies play crucial role to enrich the biodiversity. It is observed that ecosystem of this hill is undergoing unwanted changes due to anthropogenic pressure which has created terrible effect on butterfly diversity. Even the diminishing of woods has greatly affected the same. It has become an utmost priority to develop awareness among people if the earlier well favorable environment for butterflies is to be created. A sustainable and holistic management planning is necessary for conservation of the ecosystem of this hill.

References

[1]. Atmowidi, T., D. Buchori, S. Manuwoto, B. Suryobroto & P. Hidayat (2007). Diversity of pollinator insects in relation of seed set of Mustard (*Brassica rapa* L.: Cruciferae). *HAYATI Journal of Bioscience* 14: 155–161. https://doi.org/10.4308/hjb.14.4.155

[2]. Clark, P.J., J.M. Reed & F.S. Chew (2007). Effects of urbanization on butterfly species richness, guild structure, and rarity. *Urban Ecosystems* 10(3): 321–37. https://doi.org/10.1007/s11252-007-0029-4

[3]. Di Mauro, D., T. Dietz & L. Rockwood (2007). Determining the effect of urbanization on generalist butterfly species diversity in butterfly gardens. *Urban ecosystems* 10(4): 427–39. https://doi.org/10.1007/s11252-007-0039-2

[4]. Evans, J.H. (1932). *Identification of Indian Butterflies*. Bombay Natural History Society, Mumbai, 454pp.

[5]. Hammond, P.C. & J.C. Miller (1998). Comparison of the biodiversity of Lepidoptera within three forested ecosystems. *Annals of the Entomological Society of America* 91: 323–328. https://doi.org/10.1093/aesa/91.3.323

[6]. Haribal, M. (1992). *The Butterflies of Sikkim Himalaya and Their Natural History, Sikkim*. Sikkim Natural ConservationFoundation, 217pp.

[7]. Heppner, J. (1998). Classification of Lepidoptera. Part I. Introduction. *Holarctic Lepidoptera* 5(1): 1–148.

[8]. Kehimkar, I. (2008). *The Book of Indian Butterflies*. *Bombay natural History Society and Oxford University Press*, Mumbai, 497pp.

[9]. Kocher, S.D. & E.H. Williams (2000). The diversity and abundance of North American butterflies vary with habitat disturbance and geography. *Journal of Biogeography* 27(4): 785–794; http://doi.org/10.1046/j.1365-2699.2000.00454.x

[10]. Kunte, K. (2000). *Butterfies of Peninsular India*. Universities Press (Hyderabad) and Indian Academy of Sciences (Bangalore), 254pp.

[11]. Larsen, T.H., F. Escobar & I. Armbrecht (2011). Insects of the tropical andes: diversity patterns, processes and global change, pp. 228–244. In: Herzog, S.K., R. Martínez, P.M. Jorgensen & H. Tiessen (eds.). *Climate Change and Biodiversity in the Tropical Andes*. Brazil: Inter-American Institute for Global Change Research (IAI) and Scientific Committee on Problems of the Environment (SCOPE). http://www.iai.int/fles/communications/publications/scientifc/Climate_Change_and_Biodiversity_in_the_Tropical_Andes/book.pdf

[12]. Martinez, A.L., J.L. Bousquets, I.F. Fernandez & A.D. Warren (2003). Biodiversity and Biogeography of Mexican butterflies (Lepidoptera: Papilionoidea and Hesperioidea). *Proceedings of Entomological Society of Washington* 105(1): 209–244.

[13]. Mukherjee, S., S. Banerjee, G.K. Saha, P. Basu & G. Aditya (2015). Butterfly diversity in Kolkata, India: An appraisal for conservation management. *Journal of Asia-Pacific Biodiversity* 8(3): 210–221. https://doi.org/10.1016/j.japb.2015.08.001
[14]. Nitin R., Balakrishnan V.C., Churi P.V., Kalesh S., Prakash S. & Kunte K. (2018) Larval host plants of the butterflies of the Western Ghats, India. Journal of Threatened Taxa, VOL. 10 NO. 4. https://doi.org/10.11609/jott.3104.10.4.11495-11550
[15]. Rusman, R., T. Atmowidi & D. Peggie (2016). Butterflies (Lepidoptera: Papilionoidea) of Mount Sago, West Sumatra: Diversity and Flower Preference. *HAYATI Journal of Biosciences* 23(3): 132–7. https://doi.org/10.1016/j.hjb.2016.12.001
[16]. Van Nouhuys, S. & I. Hanski (2002). Colonization rates and distances of a host butterfly and two specific parasitoids in a fragmented landscape. *Journal of Animal Ecology* 71(4): 639–50. https://doi.org/10.1046/j.1365-2656.2002.00627.x
[17]. Sutherland, W.J. (1996). *Ecological Census Techniques*. University Press, Cambridge, 200pp.
[18]. Varshney, R.K. & P. Smetacek (eds.) (2015). *A Synoptic Catalogue of the Butterflies of India*. Butterfly Research Centre, Bhimtal and Indinov Publishing, New Delhi, ii+261pp+8pls.
[19]. Wynter-Blyth, M.A. (1957). *Butterflies of the Indian Region*. Bombay Natural History Society, 523pp