International Journal of Zoology Studies
ISSN: 2455-7269
Impact Factor: RJIF 5.14
www.zoologyjournals.com
Volume 2; Issue 5; September 2017; Page No. 150-156

Diversity of butterflies (Order: Lepidoptera) in West Bengal State University Campus, West Bengal, India

Samir Kumar Saha
Assistant Professor, West Bengal State University, Department of Zoology, Berunanpukuria, PO Malikapur, Kolkata, West Bengal, India

Abstract
The West Bengal State University (WBSU) campus, West Bengal, India is located in the midst of flora and fauna. An attempt has been taken to study the diversity and abundance of butterflies in West Bengal State University (WBSU) campus. A total of 61 genera were recorded under five families from the study area from July 2017 to September, 2017. The family Nymphalidae with 20 genera followed by family lycaenidae with 14 genera, family Hesperiidae 12 genera, family pieridae with 8 genera with, and 7 genera belongs to family Papilionidae were recorded inside campus area. As 61 genera of butterflies recorded within a short span of time, it can be presumed to have a good diversity of species which may be attributed to the plan of biodiversity restoration in our campus and development of management strategies so as to ensure sustenance of butterflies and ecosystem services derived from them.

Keywords: butterfly, diversity, WBSU, West Bengal, India

1. Introduction
Butterflies are extremely important group of colourful insects. They prefer specific habitats and their diversity is restricted to different seasons [1, 2]. They are highly sensitive to environmental alterations so much that they have been considered as excellent bioindicators of climate [3-8] and can be used as surrogate to assess the conservation threat to the biodiversity [9]. Apart from being bioindicators of climatic changes, butterflies are potential pollinating agents of host plants and their abundance usually indicates a healthier ecosystem [10].

Butterflies are generally regarded as one of the best taxonomically studied group of insects [11]. Worldwide there are more than 28,000 species of butterflies, with about 80 percent found in tropical regions. The Indian subcontinent bearing a diverse terrain, climate and vegetation hosts about 1,504 species of butterflies [12]. Butterflies enable sustenance of ecosystem services through their role in pollination and serving as important food chain components. Being potential pollinating agents of their nectar plants as well as indicators of the health and quality of their host plants and the ecosystem as a whole, exploration of butterfly fauna thus becomes important in identifying and preserving potential habitats under threat.

In the recent past, researchers have studied butterflies from some of the urban and sub-urban areas of Kolkata [13-16]. Institutional campuses with undisturbed natural vegetation and seasonal flowering plantation provide potential habitat for butterfly population as they are devoid of any developmental activities and pollution [17-22].

Thus the present study aimed to prepare a checklist of the butterflies, since there was no published checklist of butterflies found inside campus, and explores the species richness and diversity of butterflies in WBSU campus which might be helpful to pave the way for future research and formulation of an effective strategy for conservation of this important group of insects.

2. Materials and methods
The present study was conducted in West Bengal State University (WBSU), Barasat, Kolkata, West Bengal, India from July 2017 to September, 2017 to assess the diversity of butterflies. WBSU Campus is located in between 88° 25′ E longitudes and 44°46′ N latitude in the state of West Bengal, India (Fig. 1).

Surveys were conducted throughout the campus to cover all the habitats. Photographs and observations were taken during the day light hours. Individual images of butterflies were photo-documented and identified by cross-checking with standard references and photo guides [23-27]. All scientific names followed in the present study are in accordance with Varshney (1983) [27] and common English names follow Wynter-Blyth (1957) [26]

3. Results & Discussion
During the systematic survey, a total of 61 genera of butterfly belonging to five families were recorded from the different habitat types at WBSU campus areas during the study period, July 2017 to September 2017 (Table 1). Among the five families, family Nymphalidae represented by 20 genera (Plate-1) was the most dominant followed by Lycaenidae (14 genera, Plate-4), Hesperiidae (12 genera, Plate-5), Pieridae (8 genera, Plate-3) and Papilionidae (7 genera, Plate-2)

Results suggested that the family Nymaphalidae with 20 genera was the most dominant in the study area. Members of the Nymphalidae were always dominant in the tropical region because most of the species are polyphagous in nature, consequently helping them to live in all the habitats.

Additionally, many species of this family are strong, active fliers that might help them in searching for resources in large areas (Eswaran and Pramod 2005 [28]; Krishna Kumar *et al*. 2007 [29]

A high proportion of nymphalid species thus clearly indicates high host plant richness. Among the Nymphalidae *Junonia almana*, *Junonia atlites*, *Junonia lemonias*, *Ariadne merione* and *Hypolimnas bolina* were the dominant species, whereas among the Papilionidae, *Papilio clytia, Papilio demoleus* and *Papilio polytes*, among the Pieridae, *Catopsilia pyranthe* and *Eurema hecabe*, among the Lycaenidae, *Cigaritis vulcanus* and among the Hesperiidae, *Borbo cinnara* was the most dominant species encountered in the campus area. The family Papilionidae representing the swallowtails was recorded to be the least with 7 genera. Loss of suitable habitat may be the reason for their decline in population. Thus further studies should be taken out on this group of butterflies to get the base line information of the reason of their decline.

The present study provides an array of butterfly diversity inside WBSU campus. The geographical location of any area, its climatic conditions and vegetative composition are essential requisites for supporting a rich diversity of butterflies. Klopfer and MacArthur [30] suggested that in tropical forests species may reside not in the number of niches available, but in an increase in the similarity of coexisting species. The extent to which all these informal explanations apply is a matter of further study at micro-habitat level.

As the area houses 61 different genera of butterflies distributed throughout the campus, it can be presumed to have a good diversity of butterflies and their host plant that provide a suitable nectar source. This study strongly encourages the use of institutional estates in providing habitat facility not only to the butterflies but also to other wildlife as a whole. The data recorded in the present study may prove valuable as a reference for assessing the changes in environmental tools in the locality, in near future. Thus an attempt should be made by the administration of other universities and educational institutions to set up an eco-forest or to adopt any other conservation plans to support the wildlife of the area which can also be used to practically train the students regarding conservation issues and plans.

Table 1: List of butterflies recorded and their status during the study (*VC-Very Common, C-Common, NR–Not Rare).

Sl. No.	Common name	Scientific Name	Status*
Family: Nymphalidae (32.79%)			
1	Peacock Pansy	*Junonia almana*	VC
2	Grey Pansy	*Junonia atlites*	VC
3	Lemon Pansy	*Junonia lemonias*	C
4	Common Four Ring	*Ypthima huebneri*	VC
5	Common Leopard	*Phalanta phalantha*	C
6	Castor	*Ariadne merione*	C
7	Angled Castor	*Ariadne ariadne*	C
8	Plain Tiger	*Danaus chrysippus*	C
9	Striped Tiger	*Danaus genutia*	C
10	Blue Tiger	*Tirumala limniace*	C
11	Common Crow	*Euploea core*	C
12	Common Bush Brown	*Mycalesis perseus*	C
13	Dark-branded Bushbrown	*Mycalesis mineus*	C
14	Common Evening Brown	*Melanitis leda*	C
15	Great Eggfly	*Hypolimnas bolina*	C
16	Common Palmfly	*Elymnias hypermnestra*	C
17	Common Baron	*Euthalia aconthea*	C
18	Tawny Coster	*Acraea terpsicore*	C
19	Commander	*Moduza procris*	C
20	Cheastnut streaked Sailor	*Napthis jumbah*	C
Family: Papilionidae (11.48%)			
1	Common Mime	*Papilio clytia*	C
2	Common Lime	*Papilio demoleus*	VC
3	Common Mormon	*Papilio polytes*	C
4	Blue Mormon	*Papilio polymnestor*	C
5	Tailed Jay	*Graphium agamemnon*	C
6	Common Jay	*Graphium doson*	C
7	Common Rose	*Pachliopta aristolochiae*	C
Family: Pieridae (13.11%)			
1	Mottled Emigrant	*Catopsilia pyranthe*	VC
2	Lemon emigrant	*Catopsilia pomona*	C
3	Common Grass Yellow	*Eurema hecabe*	C
4	Common Jezebel	*Delias eucharis*	C
5	Common Gull	*Cepora nerissa*	C
6	Common wanderer	*Pareronia valeria*	C
7	Stripped albatros	*Appias libythea*	C

8	Psyche	*Leptosia nina*	C
Family: Lycaenidae (22.95%)			
1	Common Silverline	*Cigaritis vulcanus*	VC
2	Pale Grass Blue	*Pseudozizeeria maha*	C
3	Gram Blue	*Euchrysops cnejus*	C
4	Lime blue	*Chilades lajus*	C
5	Zebra blue	*Leptotes plinius*	C
6	Common Cerulean	*Jamides celeno*	C
7	forget-me-not	*Catochrysops strabo*	C
8	Monkey Puzzle	*Rathinda amor*	NR
9	Common Pierrot	*Castalius rosimon*	C
10	Rounded Pierrot	*Tarucus nara*	C
11	Plains Cupid	*Chilades pandava*	C
12	Small Cupid	*Chilades parrhasius*	C
13	Quaker	*Neopithecops zalmora*	C
14	Slate Flash	*Rapala manea*	C
Family: Hesperiidae (19.67%)			
1	Indian Palm Bob	*Suastus gremius*	C
2	Parnara Continental Swift	*Parnara spp*	C
3	Rice Swift	*Borbo cinnara*	NR
4	Small banded swift	*Pelopidas mathias*	C
5	Straight swift	*Parnara bada*	C
6	Common Redeye	*Matapa aria*	C
7	Palm Dart	*Telicota ancilla*	NR
8	Plain Palm Dart	*Cephrenes chrysozona*	C
9	Chestnut bob	*Lambrix salsala*	C
10	Common Snow Flat	*Tagiades jupetus*	NR
11	Common Bush Hopper	*Ampittia dioscorides*	NR
12	Grass Demon	*Udaspes folus*	NR

Fig 1: Location of the study area

Fig 2: Nymphalidae butterflies of WBSU Campus
1. Junonia almanac 2. Junonia atlites 3. Junonia lemonias 4. Ypthima huebneri 5. Phalanta phalantha 6. Ariadne merione 7. Ariadne ariadne 8. Danaus chrysippus 9. Danaus genutia 10. Tirumala limniace 11. Euploea core 12. Mycalesis perseus 13. Mycalesis mineus 14. Melanitis leda 15. Hypolimnas bolina 16. Elymnias hypermnestra 17. Euthalia aconthea 18. Acraea terpsicore 19. Moduza procris 20. Napthis jumbah

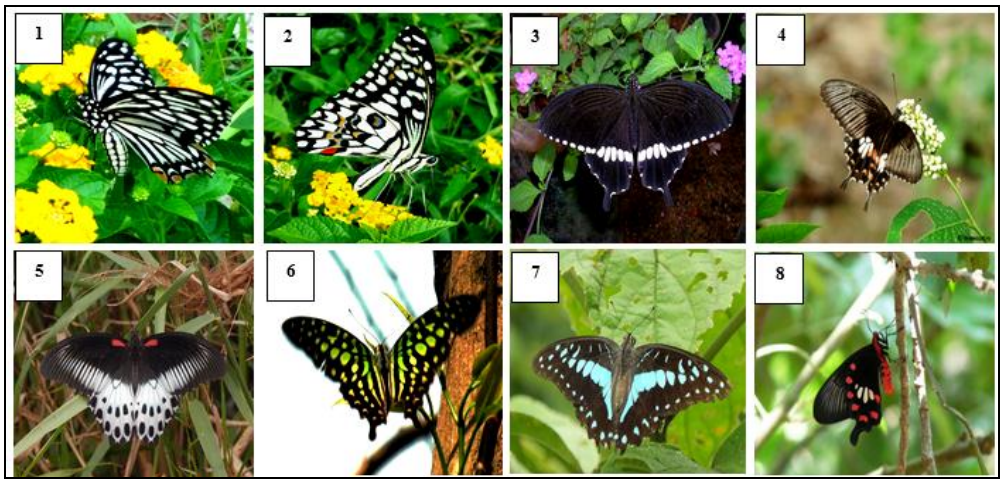

Fig 3: Papilionidae butterflies of WBSU Campus
1. Papilio clytia 2. Papilio demoleus 3. Papilio polytes (male) 4. Papilio polytes (female) 5. Papilio polymnestor 6. Graphium agamemnon 7. Graphium doson 8. Pachliopta aristolochiae

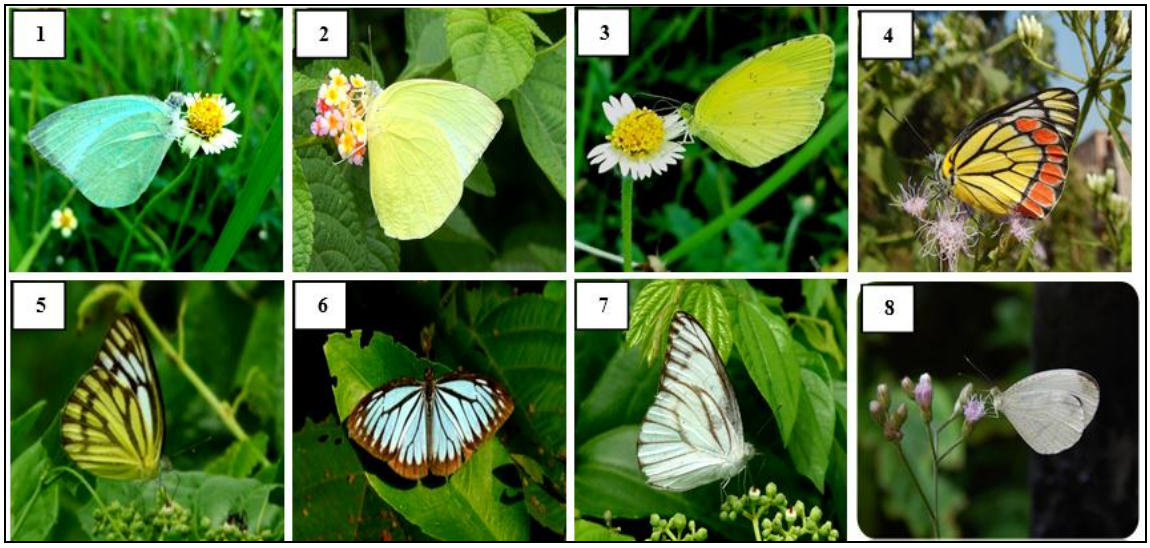

Fig 4: Pieridae butterflies of WBSU Campus
1. Catopsilia pyranthe 2. Catopsilia Pomona 3. Eurema hecabe 4. Delias eucharis 5. Cepora nerissa 6. Pareronia valeria 7. Appias libythea 8. Leptosia nina

Fig 5: Lycaenidae butterflies of WBSU Campus
1. Cigaritis vulcanus (UN) 2. Cigaritis vulcanus (UP) 3. Pseudozizeeria maha 4. Euchrysops cnejus 5. Chilades lajus 6. Leptotes plinius 7. Jamides celeno 8. Catochrysops Strabo 9. Rathinda amor 10.Castalius rosimon (UN) 11. Castalius rosimon (UP) 12. Tarucus nara 13. Chilades pandava 14. Chilades parrhasius 15. Neopithecops zalmora 16. Rapala manea

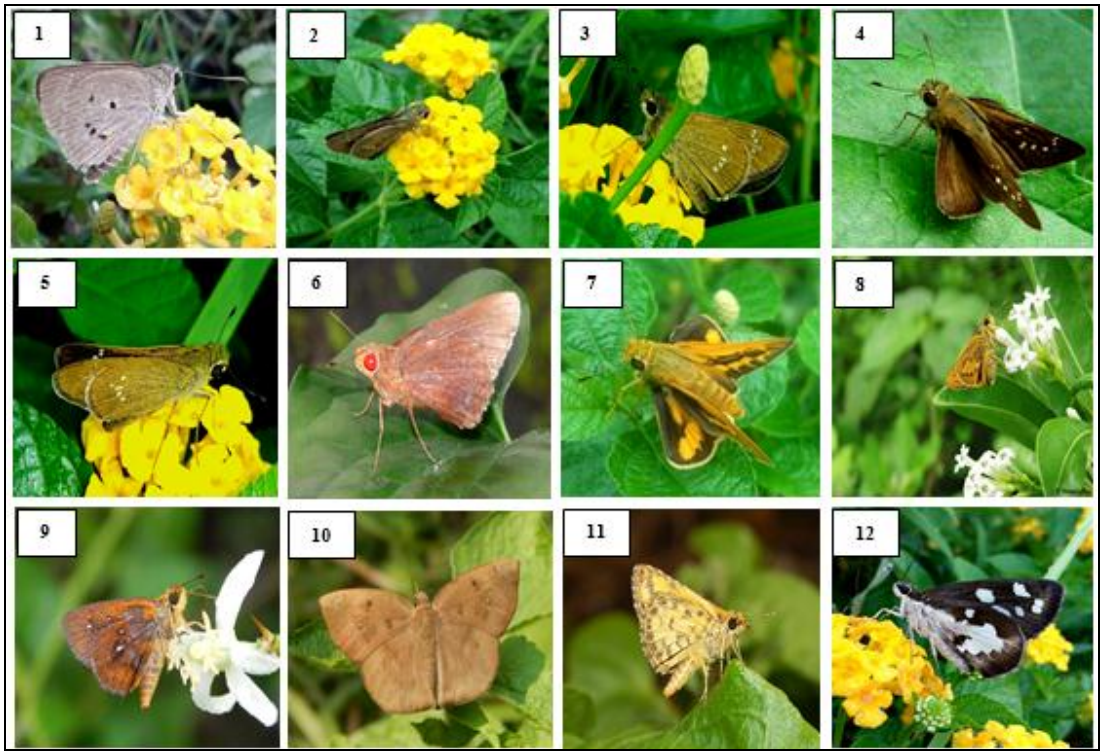

Fig 6: Hesperiidae butterflies of WBSU Campus
1. Suastus gremius 2. Parnara spp 3. Borbo cinnara 4. Pelopidas mathias 5. Parnara bada 6. Matapa aria 7. Telicota ancilla 8. Cephrenes chrysozona 9. Lambrix salsala 10. Tagiades jupetus 11. Ampittia dioscorides 12. Udaspes folus

4. Acknowledgments
The author is thankful to Honourable Vice-Chancellor and to the Department of Zoology, West Bengal State University, India for encouragement. The author also like to thank Dr. Subhamita Chaudhuri, Associate Prof., Dept. of Geography, for preparing the campus image, Dr. Supratim Mukherjee, Saurav Biswas and Pramita Roy for sharing few of their odonata image and Sondipon Chakraborty, Dept. of Zoology, for constant support.

5. References
1. Kunte K. Seasonal patterns in butterfly abundance and species diversity in four tropical habitats in the Northern Western Ghats. Journal of Bioscience 1997; 22:593-603.
2. Padhye AD, Dahanukar N, Paingankar M, Deshpande M, Deshpande D. Season and Landscape wisedistribution of butterflies in Tamhini, Northern, Western Ghats, India. Zoos' Print Journal. 2006; 21(3):2175-2185
3. Barlow J, Overal WL, Araujo IS, Gardner TA, Carlos AP. The value of primary, secondary and plantation forests for fruit-feeding butterflies in the Brazilian Amazon. Journal of Applied Ecology. 2007; 44:1001-1012.
4. Das J, Parida SP. Preliminary study of butterfly species variation in FRI Campus in accordance to its micro climatic condition. Current Life sciences. 2015; 1(3):112-117.
5. Kocher SD, Williams EH. The diversity and abundance of North American butterflies vary with habitat disturbance and geography. Journal of Biogeography. 2000; 27:785-794.
6. Parmesan C. Butterflies as bioindicators for climate change effects. In: C.L. Boggs, W.B. Watt & P.R. Ehrlich (eds.) Evolution and Ecology Taking Flight: Butterflies as Model Systems. University of Chicago Press, Chicago, 2003, 541-560.
7. Williams PH, Gaston KJ. Biodiversity indicators: Graphical techniques, smoothing and searching for what makes relationships work. Ecorgraphy. 1998; 21(5):551-560.
8. Venkata Ramana SP. Biodiversity and Conservation of Butterflies in the Eastern Ghats. The Ecoscan. 2010; 4(1):59-67.
9. Shobana G, Gunasekaran C, Lena M, Agnes DA, Sharmila BA. Diversity and abundance of butterflies in Villupuram District, Tamil Nadu, South India. International Journal of Recent Scientific Research. 2012; 3(7):637-639
10. Tiple AD, Deshmukh VP, Dennis RLH. Factors influencing nectar plant resource visits by butterflies on a university campus: implications for conservation. Nota Lepidopteralogica, 2006, 213-224.
11. Robbins RK, Opler PA. Biodiversity II, understanding and protecting our biological resources. Joseph Henry Press, Washington DC, 1997.
12. Tiple AD. Butterflies of Vidarbha region Maharashtra, India; a review with and implication for conservation. Journal of Threatened Taxa. 2011; 3(1):1469-1477.
13. Chowdhury S, Chowdhury D. On the Butterfly Fauna of Chintamoni Kar Bird Sanctuary, West Bengal. Bionotes. 2006; 8(1):20.
14. Chowdhury D, Chowdhury S. Butterfly Fauna in Mudialy Ecological Park, Kolkata, West Bengal. Bionotes. 2007;

9(1):25.
15. Chowdhury S, Das RP. Diversity of Butterflies in the Indian Botanic Garden, Howrah, West Bengal. Bionotes. 2007; 9(4):131-132.
16. Chowdhury S, Soren R. Butterfly Fauna of East Calcutta Wetlands, West Bengal, India. Checklist. 2011; 7(6):700-703.
17. Tiple AD, Deshmukh VP, Dennis RLH. Factors influencing nectar plant resource visits by butterflies on a university campus: implications for conservation. Nota Lepidopteralogica. 2006; 28:213-224.
18. Tiple AD, Khurad AM, Dennis RLH. Butterfly diversity in relation to a human-impact gradient on an Indian university campus. Nota lepidopterologica. 2007; 30(1):179-188.
19. Tiple AD. Butterfly species diversity, relative abundance and status in Tropical Forest Research Institute, Jabalpur, Madhya Pradesh, central India. Journal of Threatened Taxa. 2012; 4(7):2713-2717.
20. Kaneria M, Kaneria M, Kushwaha V. Diversity of butterfly in Bilaspur district, Chattisgarh. Asian J Exp Biol Sci. 2013; 4(2):282-286.
21. Mohapatra R, Mishra AK, Mishra S, Parida SP. A preliminary assessment of butterfly diversity in Utkal University campus, Odisha. Zoo's Print, 2013, 28.
22. Dasgupta N, Rao RJ. Diversity and seasonal occurrence of butterflies at Jiwaji University campus, Gwalior, Madhya Pradesh. Bugs R All. 2014; 21:16-20.
23. Evans WH. The identification of Indian Butterflies. Bombay Natural History Society, Bombay, 1932.
24. Kunte K. Butterflies of Peninsular India. Universities Press, Hyderabad, India, 2000.
25. Kehimkar I. The Book of Indian Butterflies. Bombay natural History Society and Oxford University Press, Mumbai, 2008.
26. Wynter-Blyth MA. Butterflies of the Indian Region. Bombay Natural History Society, Mumbai, 1957, 523.
27. Varshney RK. Index Rhopalocera Indica Common names of butterflies from India and neighbouring countries. Records of Zoological Survey of India Occassional. 1983; 47(2):1-49.
28. Eswaran R, Pramod P. Structure of butterfly community of Anaikatty hills, Western Ghats. Zoo's print Journal. 2005; 20:1939-1942.
29. Krishnakumar N, Kumaraguru A, Thiyagesan K, Asokan S. Diversity of papilionid butterflies in the Indira Gandhi Wildlife Sanctuary, Western Ghats, Southern India. Tiger. 2008; 35:1-8.
30. Klopfer PH, MacArthur RH. On the causes of tropical species diversity: niche overlap. American Naturalist 1961 95:223-226.