International Journal of Entomology Research
www.entomologyjournals.com
ISSN: 2455-4758
Received: 05-01-2024, Accepted: 28-01-2024, Published: 20-02-2024
Volume 9, Issue 2, 2024, Page No. 79-86

Butterfly fauna in urban habitats of Kolkata-A review

Sk Kabita[1*], Sehnaz Parvin[2], Firdousi Khatun[3], Masud Rana[4]
[1] Assistant Professor, HoD (Officiating), Department of Biological Sciences, Aliah University, Kolkata, West Bengal, India
[2] Research Scholar, Department of Biological Sciences, Aliah University, Kolkata, West Bengal, India
[3] Department of Biological Sciences, Aliah University, Kolkata, West Bengal, India
[4] Research Scholar, Department of Biological Sciences, Aliah University, Kolkata, West Bengal, India
Corresponding Author: kabita@aliah.ac.in

Abstract
In urban area, biodiversity is vulnerable due to the loss of habitat loss. To assess the impact of biodiversity loss and butterfly diversity, seven areas of Kolkata (East Kolkata Wetlands, campus of Lady Brabourne College, Metropolitan Kolkata, South Kolkata, Juvenile detention centre, Barasat, West Bengal State University campus, Urban Kolkata) were selected. To get the species number from these sites we took the help of seven studies by seven different authors which was previously done in Kolkata and its outskirts. Butterfly diversity in Kolkata was done according to the composition of the number of species, the status-wise distribution, and the family-wise composition in all these seven studies. From our study, it was concluded that Nymphalidae is the most dominant butterfly family followed by lycaenidae, pieridae, papilionidae, and hesperidae in all seven sites. One another important observation from this study is, Riodinidae family is present only in the above-mentioned research location no 1(East Kolkata wetlands). This family is completely absent in other six study sites.

Keywords: Butterfly diversity, urban Kolkata, nymphalidae, riodinidae

Introduction

Urbanization leads to the destruction of natural habitat. Many plant and animal species are being extinct due to the rapid expansion of construction, noise, light, and pollution in urban areas. To predict the impact of the environment on the biota, evaluation of species diversity is very essential method. Insects are essential taxa for assessing biodiversity and to get information about the condition of the environment. Variations in the habitat and distinct taxa in the terrestrial and aquatic habitat are powerful technique for monitoring the species diversity. Butterflies are a big category of insects which are belong to the order Lepidoptera. In terrestrial environment, butterflies are considered as bioindicator for giving vital information about the environmental conditions (Dey, 2017) [4]. To monitor the condition of environment and natural habitat the investigation of butterfly diversity is very essential. Butterflies play a very pivotal role in the ecosystem services through pollination as well as a component of food chain in the ecosystem. As this insect is an agent of pollination of nectar plant and indicator of the health of the host plant, the study of butterfly fauna becomes important in conservation of the habitats which are not identified and under the threat of destruction. The present study shed light on changes in the diversity of butterflies in various zones around Kolkata. The present study's purpose to make a list of various species of butterfly in Kolkata.

Study areas in Kolkata

Research location 1: East Kolkata wetlands, west Bengal, India

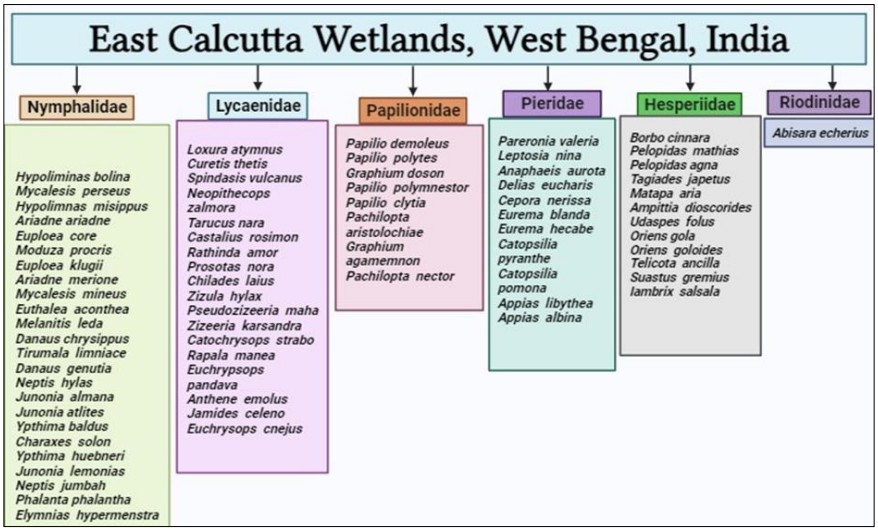


Fig 1: Butterfly fauna (family and species) of Wetlands of Eastern Kolkata (Chowdhury & Soren, 2011) [3]

Total 74 species of butterfly belong to six families from the wetlands of East Kolkata (22°25'- 22°40'N, 88°20'-88°35'E) was reported by (Chowdhury & Soren, 2011) [3]. The family Nymphalidae which is the most dominant includes total 24 species, after that the family Lycaenidae with 18 species abundant, followed by the Hesperiidae family (12 species), Pieridae family (11 species) and Papilionidae family (8 Species) and the family Riodinidae includes only one species.

Research location 2. Surrounding urban Kolkata, West Bengal, India

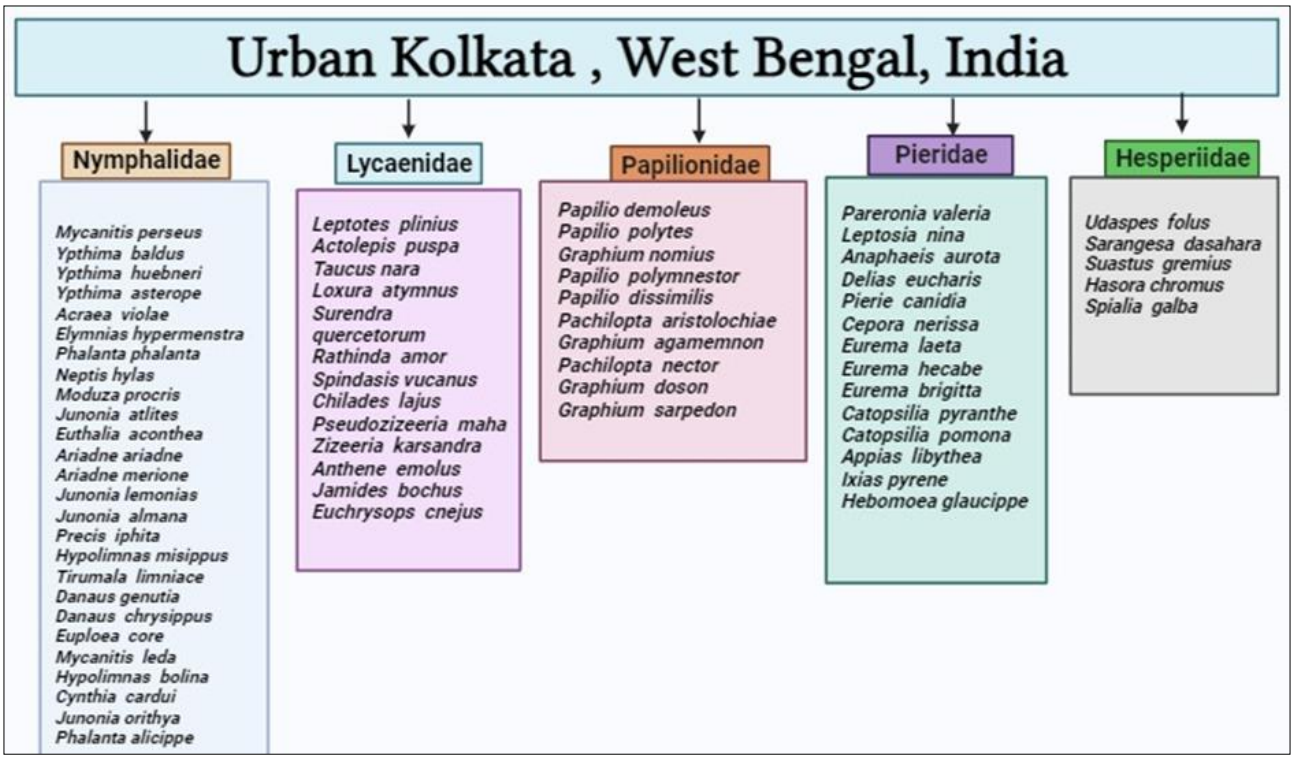
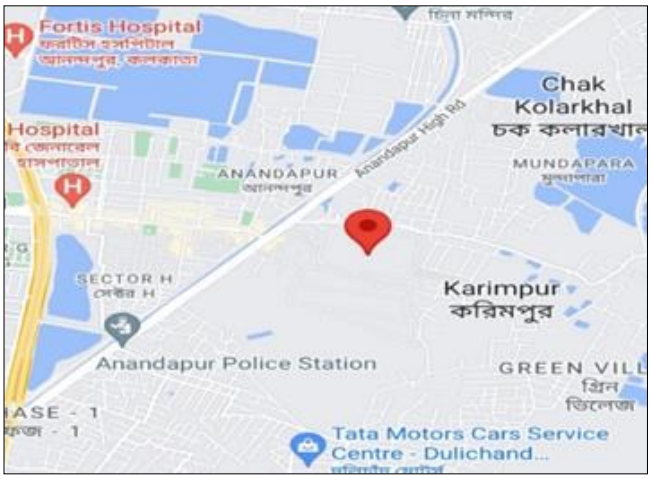


Fig 2: The butterfly fauna (families and species) surrounding urban Kolkata (Ghosh & Siddique, 2005) [5]



(Ghosh & Siddique, 2005) [5] described 68 species of butterfly belongs to the 5 families surrounding urban Kolkataand they found the family Nymphalidae which is the most dominant includes total 25 species, followed by pieridae (14 sp.), Lycaenidae (13 sp.), Papilionidae (10 sp.) and Hesperiidae (5 sp.).

Research location 3: Campus of Brabourne college, West Bengal, India

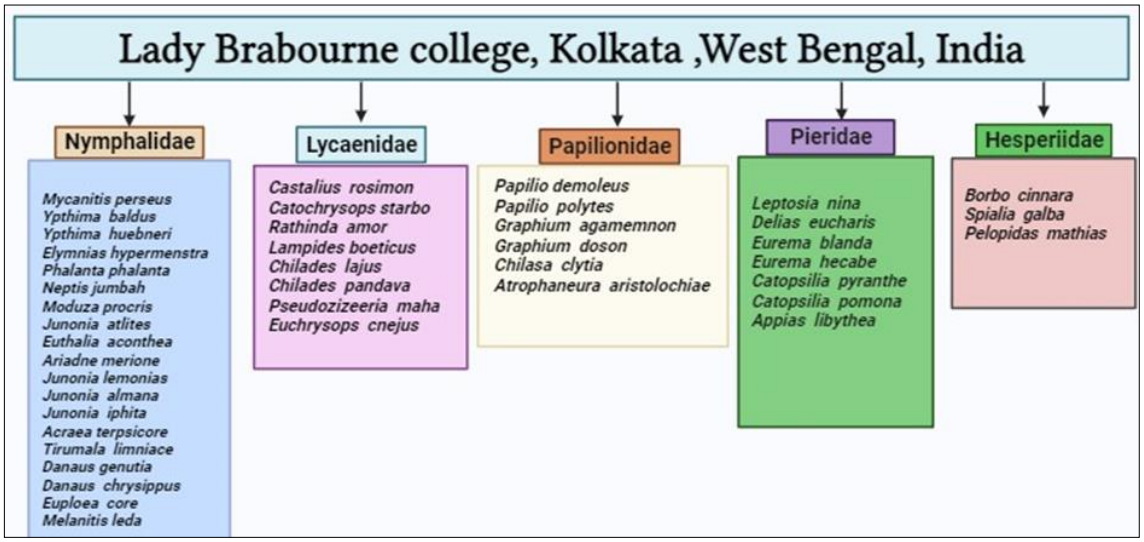


Fig 3: Butterfly diversity (families and species) in the campus of Lady Brabourne College, Kolkata, West Bengal, India (Thakur & Chakrabarti, 2017) [8]

Total of 43 species of Butterflies belongs to the five families in urban area Kolkata (22º32’40.8” N, 88º22’05” E) and (Thakur & Chakrabarti, 2017) [8] described that family Nymphalidae which is the most dominant contain 19 species, then Lycaenidae (includes 8 species), Pieridae (7 includes species), Papilionidae (contains 6 species) and Hesperiidae (includes 3 species).

Research location 4. Metropolitan Area, Kolkata, West Bengal, India.

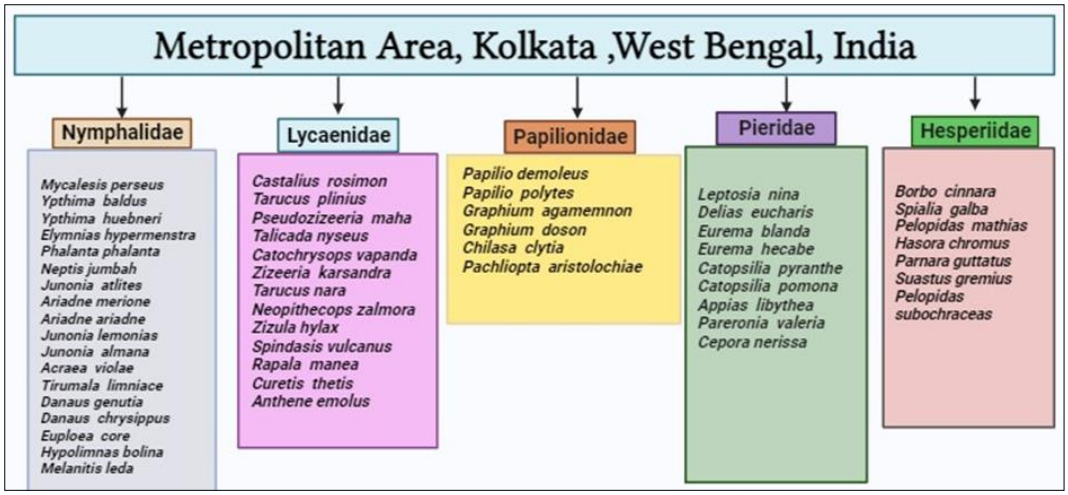


Fig 4: The species and families of butterfly in the Metropolitan Area, Kolkata (Mukherjee *et al*., 2016) [6]

A total of 54 species of Butterflies belongs to the five families from this area was described and (Mukherjee *et al*., 2016) [6] reported that family Nymphalidae that is the most dominant, includes total 18 species followed by the families Lycaenidae (13 species), Pieridae (9 species), Hesperiidae (8 species) and Papilionidae (6 species).

Research location 5. South Kolkata, West Bengal, India.

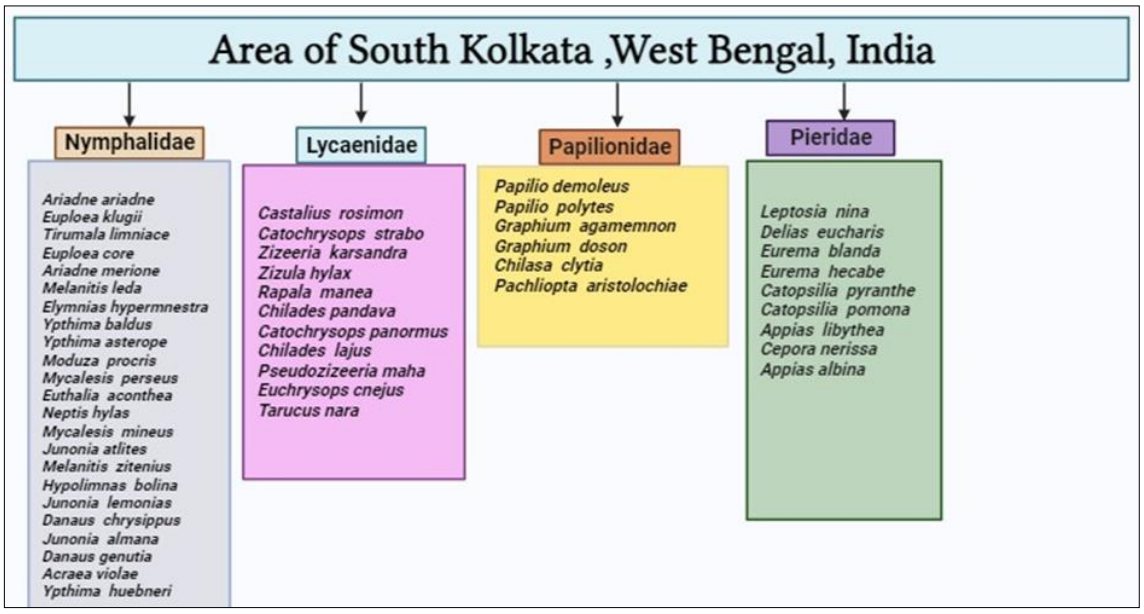


Fig 5: Diversity of the butterfly (family and species) in South Kolkata (Biswas, *et al*., 2014)

Biswas *et al*., 2014 described a total of 49 species of Butterflies belong to the four families from south Kolkata and they reported that family Nymphalidae which is the most dominant includes 23 species followed by Lycaenidae (11species), Pieridae (9 species) and Papilionidae (6).

Research location 6. Juvenile Detention center, Barasat, West Bengal, India

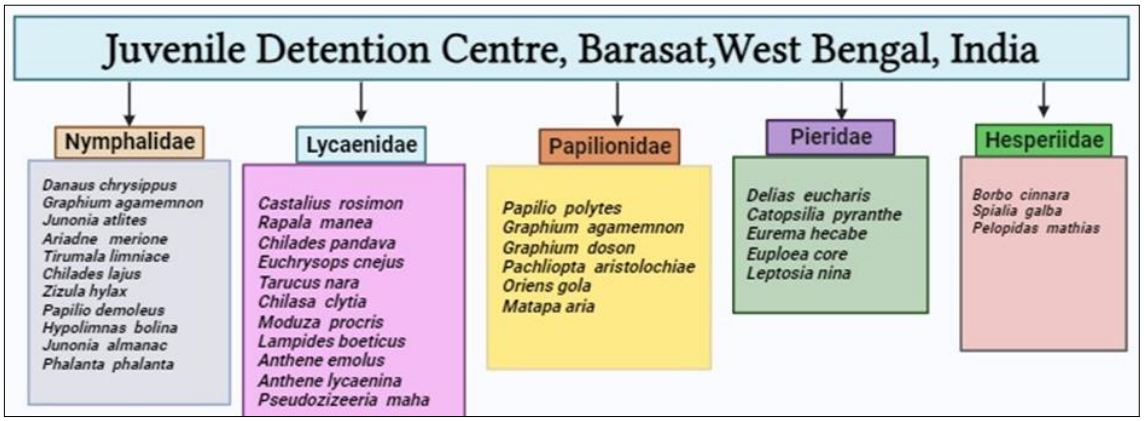


Fig 6: The diversity of butterfly from the study of (Chattopadhyay, 2017) [2] at Juveline Detention Center, (22.72° N, 88.48° E) Barasat, West Bengal, India.

A total of 38 to species of Butterflies belongs to the five families from Juvenile Detention center, Barasat and (Chattopadhyay, 2017) [2] reported that family Lycaenidae which is the most dominant containing 13 species followed by Nymphalidae (11 species), Papilionidae (6 species), Pieridae (5 species) and Hesperiidae (3 species).

Research location 7. Barasat, West Bengal, State University (Campus).

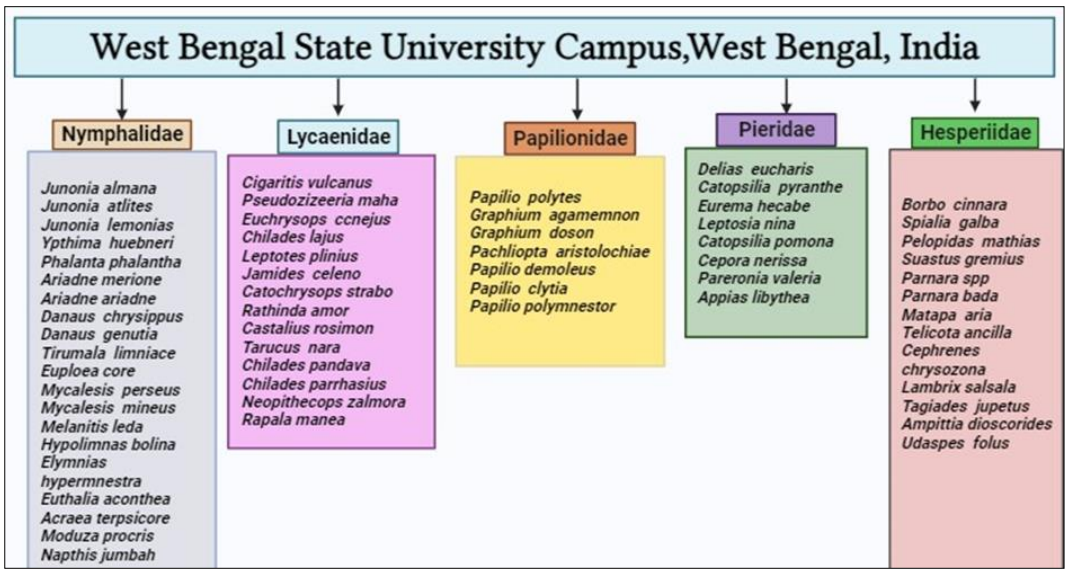


Fig 7: The diversity of butterflies (families and species) in West Bengal State University Campus (44°46′ N, 88° 25′ E) West Bengal, India.

(Saha, 2017) described a total of 63 species of butterflies belongs to five families from the west Bengal state university campus and concluded that the family Nymphalidae which is the most dominant containing 20 sp. followed by Lycaenidae (14 species), Hesperiidae (12 species), Papilionidae (8 species) and Pieridae (7 species).

Discussion

Table 1: Species Richness in all families. VC, very common, C, common, NR, not rare, R, rare.

Site	Nymphalidae	Lycaenidae	Papilionidae	Pieridae	Hesperidae
1.	VC	C	NR	C	C
2	VC	C	NR	C	R
3	VC	NR	NR	NR	R
4	VC	C	R	NR	NR
5	VC	C	R	NR	
6	NR	C	R	R	R
7	VC	C	NR	NR	C

Table 2: Status of Butterfly species in seven sites of Kolkata

Sites	Very common	common	Not rare	rare	Total species
1	24	41	8	1	74
2	26	27	10	5	68
3	19	0	21	3	43
4	18	13	17	7	54
5	23	11	9	6	49
6	0	13	11	14	38
7	20	26	15	0	61

The table 1 and 2 contain the information of the status of all species in 7 research location of Kolkata. The status of all species were categorized by the direct observation during the study work. The location no. 1 includes 24 species out of 74 species which were very common (VC), 41 were common (C) and 8 species were not rare (NR) and 1 was rare (R). The location number 2 contains 26 species out of 68 species which were very common (VC), 27 species were common(C), 10 species were not rare (NR) and 5 species were rare(R). The location no. 3 includes 19 species out of 43 species which were very common (VC), 21 species were not rare (NR) and 3 species were rare(R) and 0 were common(C).

The location no. 4 includes18 species out of 54 species which were very common (VC), 13 species were common (C), 17 species were not rare (NR) and 7 were rare (R). The site no. 5 includes 23 species out of 49 species which were very common (VC), 11 species were common (C), 9 species were not rare (NR) and 6 species were rare (R). The location no. 6 includes 0 species out of 38 species which were very common (VC), 13 species were common (C) and 11 species were not rare (NR) and14 species were rare (R). The location no. 7 contains 20 species out of 61 species which were very common (VC), 26 species were common (C), 15 species were not rare (NR) and 0 species were rare (R).

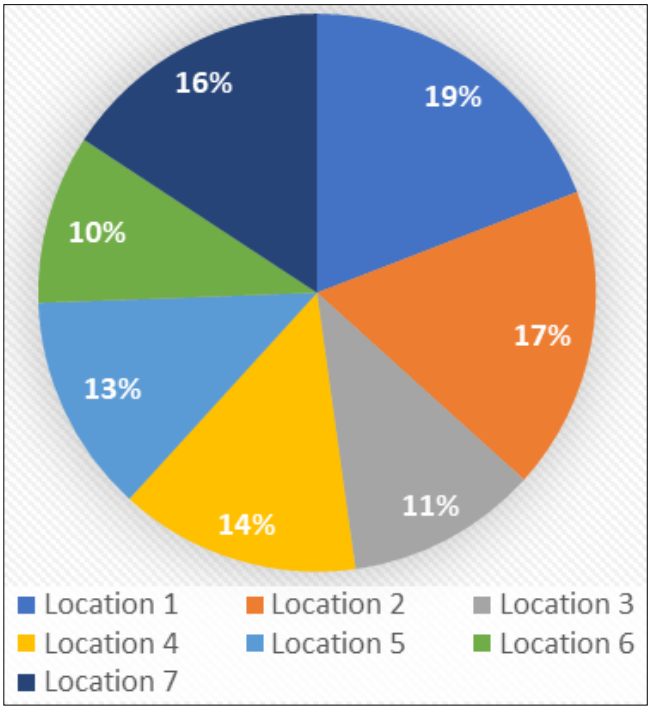


Fig 8: Butterfly species diversity according to the composition of number of species in the seven study sites

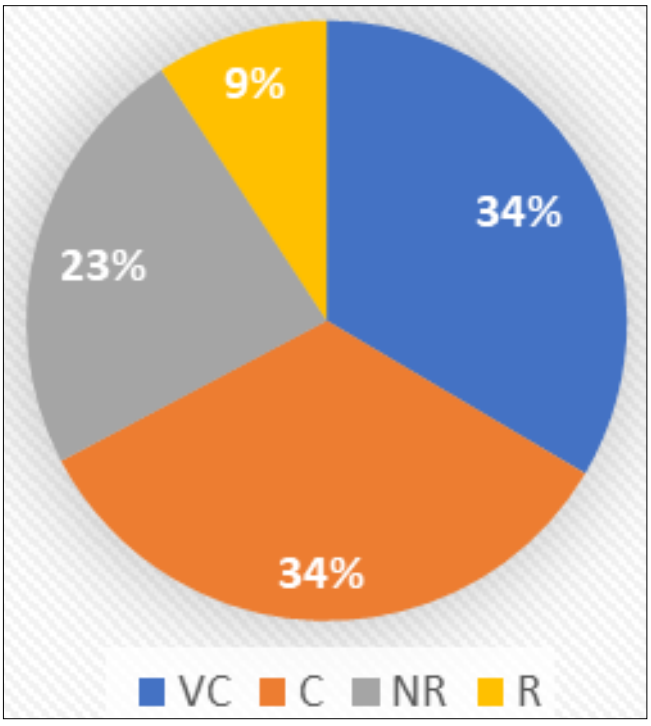


Fig 9: The variations of butterfly species in the seven research locations according to the status-based distribution

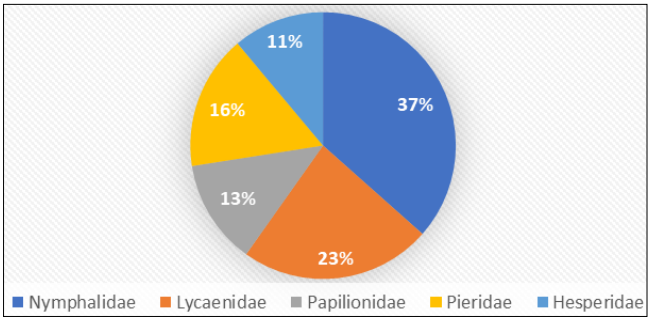


Fig 10: The variation of butterfly species diversity according to the family-based distribution at the seven research locations.

This is our own observation where we have reviewed all the work done in seven locations of Kolkata. Number of species wise composition in the seven research location is given in Fig. 8. Total number of species was observed in all seven location was 387.We have observed maximum species richness in location no. 1 and represented by 74 species (19%) followed by 68 species (17%) (site 2), 61 species (16%) (site 7), 54 species (14%) (site 4), 49 species (13%) (site 5), 43 species (11%) (site 3) and less number of individual observe in location no.6 38 species (10%).

Status-wise butterfly species diversity at seven research location is given in Fig. 9. Among these species,130 (34%) was very common,131 (34%) were common, 91(23%) were not rare and 36 (9%) were rare**.**

Family-based distribution of species of butterfly throughout the seven location is given in Fig 10, where we have found family Nymphalidae is the most dominant and represented by 141 species (37%), followed by the family Lycaenidae, represented by 90 species (23%), Pieridae represented by 63 species (16%), Papilionidae represented by 49 species (13%) and Hesperiidae, represented by 43 species (11%).

Conclusion

Nymphalidae is the most dominant butterfly family followed by lycaenidae, pieridae, papilionidae and Hesperiidae in all seven study sites.

Hesperiidae has the least number of individuals among these study areas. They could not survive in stressed condition. Habitat crisis, reduction of wetland, human intervention could be the probable cause for their reduced number but surprisingly it has been observed that maximum number of species belongs to the family Hesperiidae was present research location 1 (wetlands of Eastern kolkata) and location 7 (campus of West Bengal state university, Barasat) among the all-study areas. Species of Hesperiidae family totally absent from the site 5 (South Kolkata).

One another important observation from this study is, Riodinidae family is present only in the above-mentioned research location no 1. This family is completely absent in other six study sites. This urban area is rich in vegetation as well as wetland. From above two observations it is clear that, habitat conditions support the existence of species. From this review work it can be concluded that planned urbanization can promote Butterfly species diversity. To confirm this finding further study should be carried out on these field. Since Riodinidae family is absent in other six sites of study area, recommendation is conservational measures should be taken for this.

References

1. Biswas O. (n.d.). Comparative analysis of the local butterfly diversity of south kolkata wtih growing pollution, 3.
2. Chattopadhyay U. A Study on Nectar Plant Preference of Butterflies at Juvenile Detention Center, Barasat, West Bengal,2017:71:70–77.
3. Chowdhury S, Soren R. Butterfly (Lepidoptera: Rhopalocera) fauna of east calcutta wetlands, West Bengal, India. Check List,2011:7(6):700–703. https://doi.org/10.15560/10960
4. Dey P. A study on butterfly diversity in Singur, West Bengal, India. August, 2017.
5. Ghosh S, Siddique S. Butterfly Diversity in and Around Urban Kolkata. Records of the Zoological Survey of India,2005:104(3–4):111. https://doi.org/10.26515/rzsi/v104/i3-4/2005/159307
6. Mukherjee S, Aditya G, Basu P, Saha GK. Butterfly diversity in Kolkata metropolis: a synoptic check list. Check List,2016:12(2):1858–1858. https://doi.org/10.15560/12.2.1858
7. Saha SKH. -301730778. bi. Diversity of butterflies (Order: Lepidoptera) in West Bengal State University Campus, West Bengal, India. International Journal of Zoology Studies,2017:2(5):150–156.
8. Thakur DC, Chakrabarti P. An approach for butterfly conservation through setting up a garden in an urban area, Kolkata, India,2017:61(2):69–85.