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Availability of butterfly species (Lepidoptera) at different location of Bramhananda Keshab Chandra College campus and selection of respective nectar plant species

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Abstract

Habitat degradation and pollution in metropolitan areas have caused biodiversity loss in different seasons. Anthropogenic factors including rapid and unplanned urbanisation and slash-and-burn agriculture are seriously harming the habitat of butterfly species. The current study's objective was to ascertain the changes in species availability prior to slash and burn activities on the Bramhananda Keshab Chandra College campus in Baranagar, West Bengal. The study area contains 35 different butterfly species, which shows that the campus supports a wide range of species in the study region where slash and burn is common practice.

Keywords: Butterfly, urbanisation, slash and burn, Bramhananda Keshab Chandra College

1. Introduction

The species assemblages of butterflies differ depending on the vegetation and land use pattern (Blair and Launer, 1997; Bergerot et al., 2011; Sagwe et al., 2015). The Butterfly communities are greatly affected by vegetation changes as the larvae and the adult both require a specific range of host and nectar plants (Thomas, 1995; Honda and Kato, 2005). One of the primary causes of butterfly species declination in urban areas is pollution and habitat degradation.

Due to human activities (such as rapid urbanisation, pollution, etc.), many butterfly species have been losing their original habitat. Slash and burn farming are one of the most popular and widely used agricultural methods for producing food. But there is also less open space these

days. The loss of host and nectar plants has a profound impact on the richness, diversity, and abundance of butterfly species.

Study area

Brahmananda Keshab Chandra College is located at Baranagar, Kolkata, West Bengal. The latitude and longitude of the study area is 22°38′57.25″N and 88°22′45.94″E. The college campus is situated in an urban area having a semi natural habitat amidst concrete buildings. *Dillenia indica, Spondias pinnata, Shorea robusta,* and other trees are found on the college grounds. However, butterfly sightings are most common on 35 nectar plant species in the study area. In December, the temperature in the campus ranges from 11°C to 20°C.

Study period

The field survey on butterfly species has been conducted twice in a week in the month of December 2022.

2. Method

The butterfly species were observed in the study area from 09:00 am to 11:00 am in the morning by random observations by walking through some selected zone based on the habitat present in the study area.

Figure 1: Map showing the study area

Data collection

For the current study, butterfly species have been observed and recorded directly in the field. The information had been collected on a pre-formatted data sheet and compiled after overall observation.

3. Result

Throughout the study period a total of 35 butterfly species of four distinct families have been observed. Family Nymphalidae had a maximum number of species consisting of (17 species). The other three families Lycanidae, Pieridae and Papillionidae had 8 species, 7 species and 3 butterfly species in observation. Among these 35 butterfly species, 30 species were mentioned as common (85.71%), 2 species were mentioned very common (5.71%), and 3 species are not rare (8.75%). There were 35 different plants recorded from the study area used as butterfly food sources.

No.	Common name	Scientific name	Nectar plants
1	Common Mormon	*Papilio polytes* (Linnaeus, 1758)	*Cassia sp., Lantana camara, Clerodendrum infortunatum*
2	Common Jay	*Graphium doson* (C & R Fedler, 1864)	*Mikania micrantha, lantana camara, Clerodendrum infortunatum*
3	Tailed Jay	*Graphium agamemnon* (Linnaeus, 1758)	*Luffa sp., Urena lobata, Mikania micrantha*
4	Psyche	*Leptosia nina* (Fabricius, 1758)	*Aerva lantana*
5	Three spot grass yellow	*Eurema blanda* (Boisduval, 1836)	*Acnella uliginosa, Sida sp.*
6	Common Grass Yellow	*Eurema hecabe* (Linnaeus, 1758)	*Cassia sp., Acnella uliginosa, Sida sp.*
7	One Spot Grass Yellow	*Eurema andersonii* (Moore, 1886)	*Acnella uliginosa, Sida sp.*
8	Striped Albatross	*Appias olferna* (C. Swinhoe, 1890)	*Urena lobata, Mikania micrantha, Aerva lantana, Sida sp., Clerodendrum infortunatum*
9	Common Gull	*Cepora nerissa* (Fabricius, 1775)	*Cleome sp., Clerodendrum infortunatum*
10	Lemon Emigrant	*Catopsilia pomona* (Fabricius, 1775)	*Cassia sp., urena lobata, mikania micrantha, Sida sp.*
11	Pale Grass Blue	*Pseudozizeeria maha* (Kollar, 1844)	*Acmella uliginosa, Zizipus rugosa*
12	Darrk Grass Blue	*Zizeeria karsandra* (Moore, 1865)	*Aerva lantana, Acmella uliginosa, Sida sp.*
13	Lesser Grass Blue	*Zizina otis* (Fabricius, 1787)	*Sida sp.*

14	Common Ciliate Blue	*Anthene emolus* (Godart, 1823)	*Luffa sp.*
15	Tiny Grass Blue	*Zizula hylax* (Fabricius, 1775)	*Sida sp.*
16	Plains Cupid	*Chilades pandava* (Horsfield, 1829)	*Sida sp.*
17	Common Pierrot	*Castalius rosimon* (Fabricius, 1775)	*Cynodon dactylon, Mikania micrantha, Aerva lantana, Acmella uliginosa*
18	Common Lineblue	*Prosotas nora* (R. Fedler, 1860)	*Mikania micrantha*
19	Grey Pansy	*Junonia atlites* (Linnaeus, 1763)	*Mikania micrantha, Sida sp.*
20	Common Palmfly	*Elymnias hypermnestra* (Linnaeus, 1763)	*Areca sp., lantana camara*
21	Common Castor	*Ariadne merione* (Cramer, 1777)	*Cassia sp., Ricinus sp.*
22	Angled Castor	*Ariadne ariadne* (Linnaeus, 1763)	*Cassia sp., Ricinus sp.*
23	Tawny Coster	*Acraea taerpsicore* (Linnaeus, 1758)	*Ricinus sp., Lantana camara*
24	Common Evening Brown	*Melanitis leda* (Linnaeus, 1758)	Mud puddling
25	Common Bushbrown	*Mycalesis perseus* (Fabricius, 1775)	*Ficus sp., Aerva lantana*
26	Dark Branded Bushbrown	*Mycalesis mineus* (Linnaeus, 1758)	*Ficus sp.*
27	Common Crow	*Euploea core* (Cramer, 1780)	*Ficus sp., Mikania micrantha, lantana camara, Clerodendrum infortunatum*
28	Common Four Ring	*Ypthima huebneri* (Kirby, 1871)	*Cynodon dactylon*
29	Common Baron	*Euthalia aconthea* (Cramer, 1777)	*Mangifera sp.*
30	Plain Tiger	*Danaus chrysippus* (Linnaeus, 1758)	*Mikania micrantha, Aerva lantana, Acmella uliginosa, Sida sp., Clerodendrum infortunatum*
31	Blue Tiger	*Tirumala limniace* (Cramer, 1775)	*Luffa sp., Clerodendrum infortunatum*
32	Chestnut-Streaked Sailor	*Neptis jumbah* (Moore, 1857)	*Helicteres isora*
33	Common Tiger	*Danaus genutia* (Cramer, 1779)	*Aerva lantana*
34	Peacock Pansy	*Junonia almana* (Linnaeus, 1758)	*Mikania micrantha*
35	Commander	*Moduza procris* (Linnaeus, 1758)	*Mikania micrantha, Lantana camara*

Table 1: list of butterflies available inside the BKC college campus

4. Discussion

As it is polyphagous in nature, butterfly species may thrive in a variety of habitat types (Majumdar et al., 2012). As per earlier study, Nymphalidae has been found as the most dominant butterfly family in all the time having the highest number of Lepidopteran sp. in different types of habitats (Kunte, 1997). According to previous studies, butterflies can flourish in a variety of smaller green patches in the urban habitat (Croxton et al., 2005, Olga Tzortzakaki et al., 2019). As urbanization has been recognized as one of the most important causes of biodiversity loss (Seto et al., 2012) for all types of bio-fauna, butterfly populations are also negatively impacted by several unplanned urbanisation. So, a minor change in vegetation can lead to migration or local extinction of the native butterfly population (Blair, 1999; Mennechez et al., 2003). The present study has been conducted to understand the changes of availability of butterfly species in an urban habitat where slash and burn is a common practice. The study had been carried out to record the availability of butterfly species prior to slash and burn. Though several studies showed species richness declination due to increased urbanization, the responses differ with taxonomic groups as well as between species with taxonomic groups (Mckinney, 2008; Aronson et al., 2014; Ives et al., 2016; Piano et al., 2020). Some of the species can better cope up with increased urbanization and human diversity than others (Mckinney, 2008; Jones and Leather, 2012; Tzortzakaki et al., 2019). It would be further important to see the species accumulation after slash and burn in that same habitat.

5. References

Aronson, M.F.J., La Sorte, F.A., Nilon, C.H., Katti, M., Goddard, M.A. and Lepczyk, C.A. (2014): A global analysis of the impacts of urbanization on bird and plant diversity reveals key anthropogenic drivers. Proceedings of the Royal Society, 281:20133330.

Blair, R.B. and Launer, A.E. (1997): Butterfly diversity and human land use: Species assemblages along an urban gradient. Biological Conservation, 80:113–125.

Blair, R.B. (1999): Birds and butterflies along an urban gradient: surrogate taxa for assessing biodiversity. Ecological applications 9(1): 164-170.

Bergerot, B., Fontaine, B., Julliard, R. and Baguette, M. (2011): Landscape variables impact the structure and composition of butterfly assemblages along an urbanization gradient. Landscape Ecology, 26: 83–94.

Croxton P.J., Hann, P.J., Greatorex-Davis, J.N. and Sparks, T.H. (2005): Linear hotspots? The floral and butterfly diversity of green lanes. Biological Conservation, 121(4): 579-584.

Ehrlich, P.R. and Raven, P.H. (1964): Butterflies and plants: A study in coevolution. Evolution, 18: 586–608.

Hajra, K., Mandal, P., Jana, S. and Sahoo, A. (2015): Diversity of Butterfly in Contai and its adjoining areas Purba Medinipur, West Bengal, India.

Honda, K, and Kato, Y. (2005): Biology of Butterflies. University of Tokyo Press, Tokyo, Page-626.

Ives, C.D., Lentini, P.E., Threlfall, C.G., Ikin, K., Shanahan, D.F., Garrard, G.E. (2016): Cities are hotspots for threatened species. Global Ecology and Biogeography, 25:117-126.

Jones, E.L. and Leather, S.R. (2012): Invertebrates in urban areas: A review. European Journal of Entomology, 109: 463–478.

Kehimkar I. (2008): The Book of Indian Butterflies. Bombay natural History Society. Oxford University Press, Mumbai.

Kunte, K. (2000): Butterflies of Peninsular India. Universities Press, Hyderabad, India.

Kunte, K. (1997): Seasonal patterns in butterfly abundance and species diversity in four tropical habitats in Northern Western Ghats. Journal of Bioscience, 22, 593-603.

Lee, C.M., Park, J, Kwon, T.S., Kim, S.S., Ryu, J.W., Jung, S.J. and Lee, S.K. (2015): Diversity and density of butterfly communities in urban green areas: an analytical approach using GIS. Zoological Studies, 54: 4.

Majumder, J., Lodh, R. and Agarwala, B.K. (2012): Variation in butterfly diversity and unique species richness along different habitats in Trishna Wildlife Sanctuary, Tripura, northeast India. Check list, 8(3): 432-436.

McKinney, M.L. (2008): Effects of urbanization on species richness: A review of plants and animals. Urban Ecosystem, 11:161–176.

Mukherjee, S., Banerjee, S., Saha, G.K., Basu, P. (2019): Correspondence of butterfly and host plant diversity: foundation for habitat restoration and conservation. European Journal of Ecology, 5(1): 49-66.

Nair, A.V., Mitra, P. and Aditya, S. (2014): Studies on the diversity and abundance of butterfly (Lepidoptera: Rhopalocera) fauna in and around Sarojini Naidu college campus, Kolkata, West Bengal, India; Journal of Entomology and Zoology Studies; 2 (4): 129-134.

Pahari, P.R., Mishra, N.P., Sahoo, A., Bhattacharya T. (2018): A study on the butterfly diversity of Haldia industrial belt and adjacent rural area in Purba Medinipur district, West Bengal, India. World Scientific News, 97: 207-224.

Paris, J.R.F., Mercado, A.S., Viloria, A.L., Donaldson, J. (2013): Congruence and Diversity of Butterfly-Host Plant Associations at Higher Taxonomic Levels. PLoS One. 8, e63570 (2013).

Piano, E., Souffreau, C., Merckx, T., Baardsen, L.F., Backeljau, T., Bonte, D. (2020): Urbanization drives cross-taxon declines in abundance and diversity at multiple spatial scales. Global Change Biology, 26:1196– 1211.

Sagwe, R.N., Muya, S.M. and Maranga, R. (2015): Effects of land use patterns on the diversity and conservation status of butterflies in Kisii highlands, Kenya. Journal of Insect Conservation, 19:1119–1127.

Seto, K.C., Güneralp, B., Hutyra, L.R, (2012): Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. Proceedings of National Academy of Science, 109:16083–16088.

Thomas, J.A. (1995): The ecology and conservation of Maculinea arion and other European species of large blue butterfly; Ecology and Conservation of Butterflies, Page-180-210 In A.S. Pullin (ed.).

Tzortzakaki, O., Kati, V., Panitsa, M., Tzanatos, E. and Giokas, S. (2019): Butterfly diversity along the urbanization gradient in a densely-built Mediterranean city: Land cover is more decisive than resources in structuring communities. Landscape Urban Plan 183:79–87.