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## BUTTERFLY DIVERSITY IN AND AROUND URBAN KOLKATA

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### INTRODUCTION

Butterflies are good indicators of environmental alterations as they are sensitive and are directly affected by changes in the habitats, atmosphere, temperature and the weather conditions. The present work is on variation in diversity of butterflies in different impact zones across natural and semi-natural vegetation types in and around the Kolkata metropolis. Though India hosts 1,501 species of butterflies (Gaonkar 1996), in West Bengal Papilionids are represented by 26 species in 6 genera, Danainae by 17 species in 5 genera (Mondal and Maulik, 1997), Hesperidae by 32 species in 29 genera (Ghosh and Chaudhury, 1997), Pieridae by 25 species and 23 subspecies (Ghosh and Chaudhury, 1997), Satyridae by a total of 39 species and subspecies (Bhattacharya, 1997) and Lycaenidae by 83 species distributed over 47 genera. These reports were from 11 out of 17 districts of this state. Of all the aforementioned species, Kolkata harboured 40 species (Gupta, 1997). Ghosh (1991) reported as well that 'the city of Calcutta, within its limit, exhibits at least 40 species of butterflies' We, therefore, intended to obtain the present status of butterflies in urban Kolkata during the period of our study *i.e.*, April 2002 to May 2004.

### STUDY AREA

We have explored 11 sites intensely, given their contrasting vegetation types and level of disturbance. The sites include— **Ia** = Shyamkhola, **Ib** = Narendrapur WLS, **II** = IIM Joka, **III** = East Calcutta Wetlands, **IVa** = Banobitan, **IVb** = Subhas Sarobar, **Va** = Tala Park, **Vb** = ISI Baranagore, **VIa** = Maidan, **VIb** = Eden Gardens, **VII** = Brace Bridge Wetlands, **VIII** = Tollygunge Golf Club, **IXa** = Agri-Horticultural Society of India, **IXb** = Alipore Zoological Garden, **Xa** = Esplanade, **Xb** = Raj Bhavan, **XI** = Rabindra Sarobar.

All the areas lie between longitude 88°26'09 E–88°17'63 E; latitude 22°38'47 N–22°25'24 N.

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### SITE DESCRIPTION

Narendrapur, IIM Joka, Shyamkhola are well wooded with profusion of old trees (both native and exotic), surrounded by a mosaic of concrete buildings. The marshes, wetlands and scrubs along part of Eastern Calcutta Wetlands, Subhas Sarobar and Rabindra Sarobar have patches of grasslands which are subjected to grazing. The sites like Tollygunge Golf Club, Banobitan, Eden Gardens, Agri-Horticultural Society of India, Alipore Zoological Garden, Indian Statistical Institute, Raj Bhawan and Brace Bridge are well maintained, protected places where human interferences are relatively low. Sites like Maidan, Esplanade and Tala Park, although are rich with old and new trees, but these areas are very much disturbed by continuous human interferences and activities. Most of the sites face vehicular pollution apart from other hazards (see Table II).

### METHOD

The observations here are based on the seasonal visits. Butterflies were counted along definite paths in each site and their relative abundance has been recorded in accordance with the following scale (Clench 1979) :

Code	No. of specimens seen
0	125–625 specimens in 1 hr
1	25–125 specimens in 1 hr
2	5–25 specimens in 1 hr
3	1–5 specimens in 1 hr
4	1 specimen in 1 hr
5	1 specimen in 1–5 hr
6	1 specimen in 5–25 hr
7	1 specimen in 25–125 hr
8	1 specimen in 125–625 hr

### The classified habitats :

Low impact zone		Moderate impact zone		Influenced zone
Suburban Orchard	Wetland	Urban Greenery	Agriculture	Built up areas with vegetation
Ia, Ib, II	III, VII	IVa, IXa, IXb, VIII, Xb, Vb, VIb	VII, Ia	Xa, VIa, IVb, XI, Va

## RESULT

*Distribution* : Table 1 depicts the checklist of 68 butterfly species recorded and identified so far.

- The orchards and the scrubs appear to be the most species rich habitat (nearly 57 spp).
- The woodland harbours nearly 4 species that are unique to it.
- The vegetation along the built up areas along with the agricultural land also harbour about 50% of the total identified species, and these are mostly danaiids.

*Flight period* : Butterflies in all habitats have distinct flight periods.

- Single, short flight period – Rounded Pierrot at Shyamkhola.
- Multiple peaks (*e.g.*, Tailed Jay, Grey Pansy *etc.*).
- One, but fairly long flight period (*e.g.* Chocolate Pansy, Blue Mormon at Narendrapur WLS).
- Among the whites, the Cabbage White shows the most erratic flight.
- Psyche is the weakest flier, flapping within a range up to 1 metre above grass level.

**Note** : A curious behavior has been observed in Evening Brown, when disturbed it settles among dry leaves nearly horizontally. When they are not disturbed, settle with their wings vertically.

*Seasonality* : During three years' (April 2002 to March 2004) study of the behavior of butterfly, it has been observed that in Kolkata urban area most of the butterflies were active during April-May-June (*i.e.*, summer) and October-November (*i.e.*, post-monsoon), while activities were fairly low during monsoon and winter.

- Species seen throughout the year with a short population peak in a specific season– Tawny Coster at IIM, Joka, in summer (April-May), Common Jezebel at AHSI in winter (December), Blue Tiger in IIM Joka and Shyamkhola in summer.
- Species occur only for a few months, viz, Commander at IIM Joka, Tollygunge Golf Club, ISI Baranagore, recorded during the post monsoon and winter seasons only; the Common Gull is recorded at most of the sites during pre and post monsoon months.
- Species like Psyche, Peacock Pansy, Plain Tiger, Common Emigrant, *etc.* have similar abundance throughout the year with little fluctuations.

**Note** : There was a case of population explosion in Common Banded Awl (*Hasora chromus*) might have resulted from its synchronous egg laying activity. A large number of individuals

gathered on Divi-Divi *Caesalpinia coriaria* (Caesalpiniaceae) on a cloudy forenoon (July 27, 2003) at Eden Gardens.

Table II presents proportion of total species recorded at 11 sites across the seasons with their vegetation assemblage.

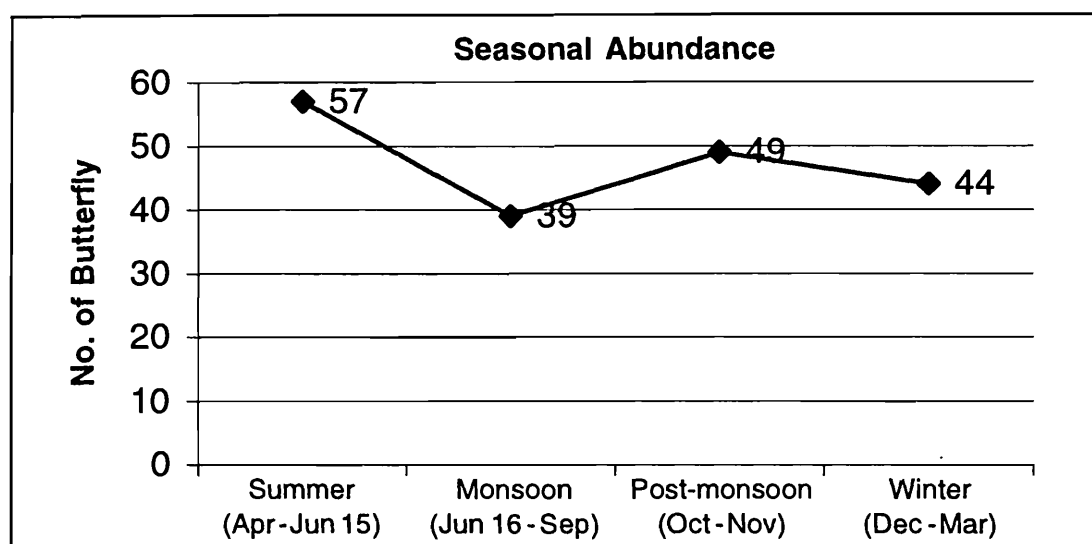


Fig. 1. : Seasonal abundance of butterfly.

*Limitations :*

- Many species evaded detection or precise field identification.
- The survey on Swifts and Skippers is yet to be completed due to some constraints.
- The data is based on morning observations (6 : 30– 12 noon). Therefore, many nocturnal and crepuscular species may have evaded detection.

Table I : Checklist of butterflies (identified spp.).

Sl. No.	Common name*	Scientific name*	Relative abundance during peak seasons
	Family : PAPILIONIDAE		
01.	Tailed Jay	<i>Graphium agamemnon</i>	2
02.	Spot Swordtail	<i>Graphium nomius</i>	8
03.	Common Mime	<i>Papilio dissimilis</i>	5
04.	Lime Butterfly	<i>Papilio demoleus</i>	4
05.	Common Mormon	<i>Papilio polytes</i>	3
06.	Blue Mormon	<i>Papilio polymnestor</i>	8
07.	Common Rose	<i>Pachliopta aristolochiae</i>	8
08.	Crimson Rose	<i>Pachliopta hector</i>	6
09.	Common Bluebottle	<i>Graphium sarpedon</i>	3
10.	Common Jay	<i>Graphium doson</i>	2

Table I : (Cont'd.).

Sl. No.	Common name*	Scientific name*	Relative abundance during peak seasons
	<b>Family : PIERIDAE</b>		
01.	Mottled Emigrant	<i>Catopsilia pyranthe</i>	3
02.	Common Emigrant	<i>Catopsilia pomona</i>	2
03.	Common Jezebel	<i>Delias eucharis</i>	3
04.	Psyche	<i>Leptosia nina</i>	1
05.	Indian Cabbage White	<i>Pieris canidia</i>	2
06.	Common Gull	<i>Cepora nerissa</i>	2
07.	Common Albatross	<i>Appias albina</i>	2
08.	Common Wanderer	<i>Pareronia valeria</i>	5
09.	Common Grass Yellow	<i>Eurema hecabe</i>	1
10.	Spotless Grass Yellow	<i>Eurema laeta</i>	7
11.	Small Grass Yellow	<i>Eurema brigitta</i>	8
12.	Yellow Orange Tip	<i>Ixias pyrene</i>	6
13.	Great Orange Tip	<i>Hebomoea glaucippe</i>	8
14.	Striped Albatross	<i>Appias libythea</i>	8
	<b>Family : LYCAENIDAE</b>		
01.	Zebra Blue	<i>Leptotes plinius</i>	8
02.	Common Hedge Blue	<i>Actolepis puspa</i>	1
03.	Rounded Pierrot	<i>Tarucus nara</i>	4
04.	Yamfly	<i>Loxura atymnus</i>	6
05.	Common Acacia Blue	<i>Surendra quercetorum</i>	4
06.	Common Cerulean	<i>Jamides celeno</i>	3
07.	Common Silverline	<i>Spindasis vulcanus</i>	5
08.	Pale Grass Blue	<i>Pseudozizeeria maha</i>	3
09.	Dark Grass Blue	<i>Zizeeria karsandra</i>	2
10.	Lime Blue	<i>Chilades laius</i>	4
11.	Gram Blue	<i>Euchrysops cnejus</i>	4
12.	Monkey Puzzle	<i>Rathinda amor</i>	7
13.	Dark Cerulean	<i>Jamides bochus</i>	7
	<b>Family : NYMPHALIDAE</b>		
01.	Common Bushbrown	<i>Mycanitis perseus</i>	5
02.	Common Five-ring	<i>Ypthima baldus</i>	4
03.	Common Four-ring	<i>Ypthima huebneri</i>	4
04.	Common Three-ring	<i>Ypthima asterope</i>	3

Table I : (Cont'd.).

Sl. No.	Common name*	Scientific name*	Relative abundance during peak seasons
05.	Tawny Coster	<i>Acraea violae</i>	2
06.	Common Palmfly	<i>Elymnias hypermenstra</i>	4
07.	Common Leopard	<i>Phalanta phalantha</i>	8
08.	Common Sailer	<i>Neptis hylas</i>	4
09.	Commander	<i>Moduza procris</i>	8
10.	Grey Pansy	<i>Junonia atlites</i>	3
11.	Common Baron	<i>Euthalia aconthea</i>	7
12.	Angled Castor	<i>Ariadne ariadne</i>	5
13.	Common castor	<i>Ariadne merione</i>	3
14.	Lemon Pansy	<i>Junonia lemonias</i>	6
15.	Peacock Pansy	<i>Junonia almana</i>	2
16.	Chocolate Pansy	<i>Precis iphita</i>	8
17.	Danaid Eggfly	<i>Hypolimnas misippus</i>	4
18.	Blue Tiger	<i>Tirumala limniace</i>	1
19.	Striped Tiger	<i>Danaus genutia</i>	2
20.	Plain Tiger	<i>Danaus chrysippus</i>	2
21.	Common Indian Crow	<i>Euploea core</i>	3
22.	Common Evening Brown	<i>Mycanitis leda</i>	3
23.	Great Eggfly	<i>Hypolimnas bolina</i>	6
24.	Painted Lady	<i>Cynthia cardui</i>	8
25.	Blue Pansy	<i>Junonia orithya</i>	8
26.	Small Leopard	<i>Phalanta alicippe</i>	6
	Family : <b>HESPERIIDAE</b>		
01.	Common Small Flat	<i>Sarangesa dasahara</i>	
02.	Indian Palm Bob	<i>Suastus gremius</i>	
03.	Common Banded Awl	<i>Hasora chromus</i>	
04.	Grass Demon	<i>Udaspes folus</i>	
05.	Indian Skipper	<i>Spialia galba</i>	

\*the classification is per Ackery (1986). The common and Scientific names are adopted from Haribal (1992) and Kunte (2000).

**Table II** : Description of the sampling sites.

<b>Name of the Site</b>	<b>Vegetation assemblage (Flowering Plants)</b>	<b>No. of identified spp. of Butterflies</b>	<b>Remarks on Vegetation</b>
<b>Rajbhawan</b>	Approximately 220 species	<b>28</b>	Exotic and indigenous plants are in the ratio of 50 : 50. Many of them are introduced in recent past.
<b>Narendrapur WLS</b>	Approximately 110 species	<b>55</b>	Well wooded with profusion of old trees, native trees, besides exotic ones. Most of them are natural vegetations.
<b>Brace Bridge Wetland</b>	Approximately 218 species	<b>38</b>	Marshes, wetlands and scrubs along with indigenous species. Very few exotics were seen. As much as 85% species have been planted in recent past. Garden varieties are prevalent.
<b>Tollygunj Golf Club</b>	Approximately 170 species	<b>46</b>	Mostly Exotic and indigenous plants in the ratio of 50 : 50.
<b>IIM Joka</b>	Approximately 230 species	<b>52</b>	Mostly indigenous species. Very few exotics were seen. Almost natural, except the garden & agricultural variety.
<b>Shyamkhola</b>	Approximately 187 species	<b>43</b>	Mostly indigenous species. Very few exotics were seen. Most of them are natural vegetations.
<b>ISI Baranagar</b>	Approximately 130 species	<b>34</b>	Mostly horticultural plants with a few old fruit trees.
<b>Bonobitan</b>	Approximately 128 species	<b>34</b>	Mostly horticultural plants.
<b>Nalban</b>	Approximately 207 species	<b>39</b>	Marshes, wetlands and scrubs along with indigenous species; prone to little grazing.
<b>Tala Park</b>	Approximately 128 species	<b>38</b>	Old trees, native trees, besides exotic ones.
<b>AHSI</b>	Approximately 135 species	<b>35</b>	Well maintained protected place mostly with horticultural plants.
<b>Maidan</b>	Approximately 79 species	<b>35</b>	Good number of indigenous species besides the exotic one.
<b>Subhas Sarovar</b>	Approximately 129 species	<b>29</b>	Water body surrounded by a few old native & exotic species, prone to little grazing.
<b>Eden Gardens</b>	Approximately 107 species	<b>38</b>	Mostly horticultural plants with a few old native & exotic species.
<b>Rabindra Sarovar</b>	Approximately 101 species	<b>28</b>	Water body surrounded by many exotic species; prone to little grazing.
<b>Zoo Garden</b>	Approximately 89 species	<b>38</b>	Exotic and indigenous plants are in the ratio of 50 : 50.
<b>Total</b>	<b>370 species</b>	<b>68 species</b>	

### SUMMARY

The present butterfly diversity study within Kolkata urban area have generated a comprehensive baseline data, which will help in future assessment of biodiversity and any impact on the habitat of the present study area. Identification of any change in environment of Kolkata and its surroundings, would generate sharp, firm, healthy and emphatic argument that will help proper land use planning and hence sustainable development. Drastic change in land use pattern associated with urbanization in Kolkata or in such areas, would result in an immense impact on the concerned wildlife of the area. As many as 75% of the species are recorded from moderate impact zone; many of them are dependant on natural vegetation surrounding Kolkata for their survival. About 6% of the species are recorded exclusively from the low impact zone, thus are more vulnerable to any further destruction.

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### REFERENCES

- Ackery, P. R. (1984). Systematic & Faunistic Studies on Butterflies, page 9-21, in Vane Wright, R.I. & P.R. Ackery (eds.) The Biology of Butterflies, Symp. of Royal Entom. Soc. of London, No. 11, Academic Press.
- Bhattacharya, D. P. (1997). State Fauna Series 3 : Fauna of West Bengal, Part 7, page 729-753, Zoological Survey of India.
- Clench, H. K. (1979). How to make regional list of butterflies : some thoughts. *J. Lep. Soc.*, **33**(4), page 261-281.
- Gaonkar, H. (1996). Butterflies of the Western Ghats with notes on those of Sri Lanka, Centre for Ecological Sciences, Indian Institute of Science, Bangalore.
- Ghosh, A. K. (1991). Ecology and Environment of Calcutta in "Calcutta's Urban Future" Government of West Bengal.
- Ghosh, S. K. and Choudhury, M. (1997). *Fauna of West Bengal, State Fauna Series, 3 (Part 7) : 275-318*, Zoological Survey of India.
- Gupta, I. J. (1997). *Fauna of West Bengal, State Fauna Series, 3 (Part 7) : 429-489*, Zoological Survey of India.



- Haribal, M. (1992). *Butterflies of Sikkim Himalaya and their natural history*, Natraj Publishers, Dehradun.
- Kunte, K. J. (2000). *Butterflies of Peninsular India*. Indian Academy of Sciences, Bangalore and Universities Press, Hyderabad.
- Mondal, D. K. and Maulik, D. R. (1997). *Fauna of West Bengal, State Fauna Series, 3 (Part 7) : 755-793*, (Published Zoological Survey of India).
- Rothney, G. A. J. (1882). A list of the Butterflies captured in Barrackpore park during the month of September, 1880 to August, 1881; *Entomologists, Mon Mag-19* : page 33-36.
- Sanders, D. F. (1944). A list of and Notes on the Butterflies of Calcutta, *J. Beng Nat. Hist. Soc.*, **19**(1) : page 29-41.