BUTTERFLY DIVERSITY IN AND AROUND KALYANI, A SUBURBAN CITY NEAR KOLKATA, WEST BENGAL

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Butterflies have been reported as significant indicator organisms, because of their hypersensitivity to the changes in environmental factors. The diversity and distribution of butterflies depend on specially three types of vegetation populations, e.g. larval food plants, nectar plants and shade plants (Manzoor et al., 2013).

Though some works on butterfly diversity have been done in and around Kolkata metropolitan region, Kalyani has never been assessed for its butterfly fauna. Earlier in the year 1882, Moore worked on the butterflies of Calcutta and the collections were made from Barrackpore Park. Afterwards, Niceville (1885), and recently Chowdhury & Chowdhury (2007), Ghosh (2008), Biswas et al. (2012), Mukherjee et al. (2016) and other workers have done studies on the butterfly diversity of this region. Biswas et al.(2016) compiled 132 species of butterflies from Kolkata region.

Present study was carried out in Kalyani, a suburban city [22° 58' 30" N, 88° 26' 4" E], located around 50 kilometers away from Kolkata, in the Nadia district of West Bengal, India. The survey was conducted during 2017-2018, for about a year to explore the butterfly fauna of the area. Identifications were done from the photographs taken in the field with the help of Kehimkar (2008).

Present communication reports a total of 26 butterfly species, under 23 genera distributed in 4 families. Maximum species were reported from the family Nymphalidae (14 species) followed by Pieridae (6 species), Papilionidae and Lycaenidae (3 species in each), respectively.

List of Butterflies recorded from Kalyani city :

Lycaenidae

1. *Castalius rosimon* (Fabricius, 1775). Common Pierrot.
2. *Chilades pandava* (Horsfield, 1829). Plains Cupid.
3. *Zizeeria karsandra* (Moore, 1865). Dark Grass Blue.

Nymphalidae

4. *Acraea terpsicore* (Linnaeus, 1775). Tawny Coster.
5. *Ariadne merione* (Cramer, 1779). Common Castor.
6. *Danaus chrysippus* (Linnaeus, 1758). Plain Tiger.
7. *Elymnias hypermnestra* (Linnaeus, 1763). Common Palmfly.
8. *Euploea core* (Cramer, 1780). Common Crow.
9. *Euthalia aconthea* (Cramer, 1779). Common Baron.
10. *Hypolimnas misippus* (Linnaeus, 1764). Danaid Eggfly.
11. *Junonia almana* (Linnaeus, 1758). Peacock Pansy.
12. *Junonia lemonias* (Linnaeus, 1758). Lemon Pansy.
13. *Melanitis leda* (Linnaeus, 1758). Common Evening Brown.
14. *Mycalesis perseus* (Fabricius, 1775). Common Bush Brown.
15. *Neptis hylas* (Linnaeus, 1758). Common Sailer.
16. *Ypthima baldus* (Fabricius,1775). Common Five ring.
17. *Ypthima huebneri* Kirby, 1871. Common Four Ring.

Papilionidae

18. *Papilio demoleus* Linnaeus, 1758. Lime Butterfly.
19. *Papilio polytes* Linnaeus, 1758. Common Mormon.
20. *Graphium agamemnon* (Linnaeus, 1758). Tailed Jay.

Pieridae

21. *Catopsilia pyranthe* (Linnaeus, 1758). Mottled Emigrant.
22. *Cepora nerissa* (Fabricius, 1775). Common Gull.
23. *Delias eucharis* (Drury, 1773). Common Jezebel.
24. *Eurema hecabe* (Linnaeus, 1758). Common Grass Yellow.
25. *Leptosia nina* (Fabricius, 1793). Psyche.
26. *Pareronia hippia* (Fabricius, 1787). Indian Wanderer.

An assessment for the butterfly fauna of the study area (Kalyani) suggests that fast developing semi-urban cities of India still harbor high insect diversity. Kalyani shows good diversity of butterflies as compared to other Indian cities. This high diversity of butterflies calls for an extensive survey of this fauna and their conservation.

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Grow Your Own Jungle Using a Japanese Technique

How it's done : Japanese scientist Akira Miyawaki's technique involves planting native species close together so that they grow into dense forests that support local biodiversity. Experts identify soil type and add locally available biomass as nutrients. No pesticides are used. The trees grow 10 times faster, and are 30 times denser than a normal plantation.

100sqm minimum area required for a Miyawaki forest. 3 yrs for the forest to become self-sustaining. 10 yrs for it to grow into a mature, native forest.

Some time back, Taimur Ali Khan received a rather unusual gift for his first birthday. His mother, the Indian actress Kareena Kapoor's nutritionist Rujuta Diwekar presented him a 1,000sqft forest in Sonave on the outskirts of Mumbai. The trees are as young as Taimur, even younger actually, and each one of them is a local, native, climate resilient species.

Seven years ago, engineer Srinivasan Ramadorai and his wife decided to keep aside a tenth of the land on which they were building their sprawling home in Bengaluru for a grove. "We had a lot of land behind the house and wanted to cut the noise and pollution from outside" says Ramadorai. Today, the trees are over 30 feet high, and home to birds, squirrels, cats and a few non-poisonous snakes.

Afforestt, the Bengaluru-based startup that helped Ramadorai plant the grove of 150 trees, draws upon a technique created and named after Japanese botanist Akira Miyawaki. The concept aims to grow dense, self-sustaining forests of native trees quickly: while a typical forest takes 100 years to mature, the technique accelerates the process ten times.

Afforestt founder Shubhendu Sharma discovered Miyawaki in 2008 when the environmentalist came to plant a forest at Toyota's Bengaluru campus. Fascinated, Sharma decided to create a small forest in his parent's house in Kashipur in Uttarakhand, planting 224 trees of 42 species in 2010. The 70sqm grove taught Sharma an important lesson—while native trees such as mulberry, guava and mango thrived, non-native ones didn't do well. "Exotic species will die or dominate," says Sharma, who is creating a seed bank for indigenous trees. "We are creating the forest that would have existed in an area without human intervention".

Today, *Afforestt's* portfolio spans 38 cities in nine countries. He raised forests in hotels and ashrams, Bengaluru airport and Chennai metro. For instance, in a naturopathy resort in Telangana the forest is "so dense that you can get lost in it".

He recommends a minimum area of 100sqm for the forest to make an impact. His own mini-forest in Kashipur attracts a variety of birds such as bulbuls, cuckoos, parrots and hornbills, besides squirrels and honey bees.

Last year, non-profit *Say Trees* made news when it used the same technique to turn barren plot of land belonging to the railways in Bengaluru's KR Puram into a verdant forest in just five months. Earlier in 2017, the NGO created the city's first vertical garden on the pillars of a flyover. It's also trying to increase the green cover near lakes and on hillocks outside Bengaluru. Its recent project involves creating Miyawaki forests in government schools in Tamil Nadu.

"It is a misconception you need a large plot of land to grow a forest," says Dipen Jain of Mumbai-based NGO *Forest Creators*. He discovered Miyawaki's technique during work visits to Toyota, Honda, and Panasonic factories in Japan. His challenging project was in a textile mill in Tarapur, Maharashtra, where Jain and his partner had to convert a chemical waste dumpyard into a forest with 27,000 trees. "In just over a year, many trees have touched 15 feet," he says.

Others are discovering newer applications for Miyawaki's technique. Shaillie Mehta of Ahmedabad-based startup *Acacia Eco*, collaborating with a professor from HNGU university in Patan, recently created a mini-forest of 14,000 trees within the premises of a local school.

—Sonam Joshi