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SURVEY OF BUTTERFLY DIVERSITY IN EDUCATIONAL AND RECREATIONAL AREAS OF THANE

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Abstract:

Butterflies act as an indicator for a healthy ecosystem. The present study focuses on the butterfly diversity from Jnanadweepa, VPM College Campus, Thane West, and Dattaji Salvi Garden, Thane East. The city of Thane, as part of Thane district, Maharashtra, has access to adjoining forest areas, lakes and also a creek, making it rich in wetlands. The butterfly survey was performed on 2 locations, the campus of Vidya Prasarak Mandal (VPM) and Dattaji Salvi Udyan, located in Thane city. The green campus of VPM, spread across 13.5 acres is adjoined with Thane creek on one end and dense urban network on the other; has abundant floristic and faunistic diversity. Dattaji Salvi Udyan is situated in Kopri, adjacent to the busy Eastern Express Highway and Kopri bridge. The survey was conducted on both sites by photography using camera and smartphone (with camera). It was conducted in the season of monsoon (3 months i.e., July to September) and a total of 54 butterfly species belonging to 5 families were recorded.

Keywords: Butterfly, Vidya Prasarak Mandal (VPM), Dattaji Salvi Udyan

Introduction:

Arthropods are great indicators of biodiversity habitats because they respond rapidly to environmental changes. Lepidoptera (butterflies and moths) are the second largest order of arthropods and are most simply identified, making them particularly useful for the survey of biodiversity (Erhardt, 1985; Inuoye, 2001; Kremen, 1994; Tiple et. al., 2009). They are recognized as

one of the most conspicuous species of Earth's biodiversity having different conditions for different niche types for mating, breeding, and nectaring and therefore in sync with the quality and diversity of their habitats. They are also considered as utmost and functional species in the ecosystem (Larson et al. 2001).

Butterflies belong to Lepidoptera or scaled-winged insects (Greek lepidos = scales; pteron = wings). Butterflies have fine scales on their wings. The multicolored scales of butterflies give striking colors and patterns to many butterflies and providing cryptic colors and camouflage patterns to others. The patterns they make act as the best animal system for understanding the developmental and genetic processes that produce morphological variation in nature. Butterflies have been used as model organisms for a variety of studies, spanning ecology, evolutionary biology, and conservation biology (Boggs et al., 2003). Two important aspects of diversity are species richness (Prowell et al., 1999) and relative abundance of individuals (Hammond et al., 1998) of which, species richness is an important factor in conservation planning and natural resource management.

Situated in Western coastal part of Maharashtra, and very near to Mumbai, the commercial capital of India; the city of Thane, as part of Thane district has access to adjoining forest areas, many lakes, and also a creek making it predominantly rich in wetlands. Thus, it houses a substantial biodiversity, owing to the fact that it is included in the Ramsar Convention. The green campus of Vidya Prasarak Mandal (VPM), spread across a lofty 13.5 acres is adjoined with Thane creek on one end and dense urban network on the other, and having a considerable floristic and faunistic diversity. It has plantations made specifically to attract and sustain native butterflies. The Vidya Prasarak Mandal campus is unique because of its proximity to the Thane creek on one end and its well-maintained interior garden. Host plants and nectar plants are the key to successful butterfly garden. Nectar-rich flowers attract and feed butterflies. Dattaji Salvi Udyan is situated in Kopri, adjacent to the busy Eastern Express Highway and Kopri bridge connecting Thane and Mumbai cities. The present study aims to examine the diversity, distribution and species richness of butterflies across two different locations, namely, VPM's Campus and Dattaji Salvi Udyan in Thane.

Methods and Materials:

Study Area:

Two areas in Thane, viz., Jnanadweepa, VPM's Educational College Campus and Dattaji Salvi Udyan were selected for the survey.

Butterfly Survey:

A three-month survey of butterfly diversity was done using Pollard walk method (Pollard et al. 1975; Pollard, 1977; Pollard et al., 1993). It was conducted during the season of monsoon from July 2022 to September 2022 between 8 am to 10 am and 4.00 pm to 6.00 pm. The butterflies were

observed within 2.5 meters to the left and right side and five meters in front of the observer. It was conducted via field trails where small groups (5-7 surveyors) guided by renowned butterfly experts and enthusiasts. Butterfly species, number and life cycle were observed using handheld camera and smartphones with camera. The location, time and behavior were also noted down. Collecting live specimens and other disturbances were avoided during the study.

Identification:

Identification of the butterfly species on field was confirmed with the help of standard literature(Kasambe, 2016 a,b; Kehimkar, 2016; Sahni, 2000; Anderson, 1999; Courtier and Clarke, 1997). Identification of plant species was carried out using available literature(Cooke, 1967).

Results and Discussion:

Two locations were selected for the study of butterfly diversity in Thane city i.e., Jnanadweepa, Vidya Prasarak Mandal’s College Campus (VPM’s) and Dattaji Salvi Udyan. A total of 54 butterfly species belonging to 5 families were recorded with maximum species observed from Nymphalidae family (Table 3).

Our survey found that VPM’s campus showed greater species population and diversity compared with that of Dattaji Salvi Udyan. Among the brush footed butterflies (Nymphalidae) Grey Pansy butterfly were found to be most abundant, followed by Blue Tiger, Plain Tiger, Striped Tiger, Great Eggfly, Danaid Eggfly and Common Palmfly. Other prominent species include Common Grass Yellow (Pieridae), Small Salmon Arab (Pieridae), Red Pierrot (Lycaenidae), Indian Sunbeam (Lycaenidae) and Common Mormon (Papilionidae). The skippers (Hesperiidae), although a little difficult to spot and photograph, were fewer, with respect to species diversity, although Swifts and Awl were prominent among them. Presence of Small Salmon Arab is an indicator for Mangrove ecosystem.

A notable observation was some species, namely Black Rajah, and Indian Sunbeam were found nectaring in large number on the unripe pods of Cassia. The behavior of male Blue tiger butterflies aggregating on the leaves and stem of rattlepods was also observed on VPM campus. After comparing with similar studies conducted in the past on VPM campus, there has been a small decrease in overall species composition (Kurve et.al. 2013). Very little literature is available for the same in case of Dattaji Salvi Udyan.

Table 1. Family wise distribution of butterfly species recorded in VPM’s Campus

Sr. No.	Hesperiidae	Papilionidae	Nymphalidae	Pieridae	Lycaenidae
1	Ceylon Swift	Common Jay	Anomalous Nawab	Common Emigrant	Common Cerulean

2	Common Awl	Common Mormon	Black Rajah	Common Grass Yellow	Common Pierrot
3	Pelopidas Sp. Swift	Common Rose	Blue Oakleaf	Common Gull	Dark Cerulean
4	Udaspes	Lime Butterfly	Blue Tiger	Common Jezebel	Gram Blue
5	Pale Palm Dart	Tailed Jay	Chestnut-Streaked Sailer	Psyche	Indian Sunbeam
6	Indian Palm Bob	Blue Mormon	Chocolate Pansy	Small Salmon Arab	Lime Blue
7	-	Spot Swordtail	Common Baron	Western Striped Albatross	Red Pierrot
8	-	-	Common Castor	Tree Yellow	Tiny Grass-Blue
9	-	-	Common Crow	-	-
10	-	-	Common Evening Brown	-	-
11	-	-	Common Palmfly	-	-
12	-	-	Great Eggfly	-	-
13	-	-	Grey Pansy -	-	-
14	-	-	Common Nawab	-	-
15	-	-	Common Sailer	-	-
16	-	-	Danaid Eggfly	-	-
17	-	-	Lemon Pansy	-	-
18	-	-	Gaudy Baron	-	-
19	-	-	Glassy Tiger	-	-
20	-	-	Peacock Pansy	-	-
21	-	-	Plain Tiger	-	-
22	-	-	Striped Tiger	-	-
23	-	-	Tawny Coster	-	-
24	-	-	Painted Lady	-	-
25	-	-	Common Leopard	-	-

Table 2. Family wise distribution of butterfly species recorded in Dattaji Salvi Udyan

Sr. No.	Hesperiidae	Papilionidae	Nymphalidae	Pieridae	Lycaenidae
1	Udaspes	Blue Mormon	Blue Tiger	Small Salmon Arab	Red Pierrot
2	-	Common Mormon	Chocolate Pansy	Common Grass	Common Cerulean
3	-	Blue Mormon	Danaid Eggfly	Tree Yellow	-

4	-	Spot Swordtail	Glassy Tiger	-	-
5	-	Tailed Jay	Great Eggfly	-	-
6	-	-	Grey Pansy	-	-
7	-	-	Common Palmfly	-	-
8	-	-	Plain Tiger	-	-

Table 3: No. of butterfly species recorded per family at both the location:

Sr. No.	Family	No. of Species recorded at VPM's Campus	No. of Species recorded at Dattaji Salvi Udyan
1	Hesperiidae	06	1
2	Papilionidae	07	5
3	Nymphalidae	25	8
4	Pieridae	08	3
5	Lycaenidae	08	2
	Total	54	19

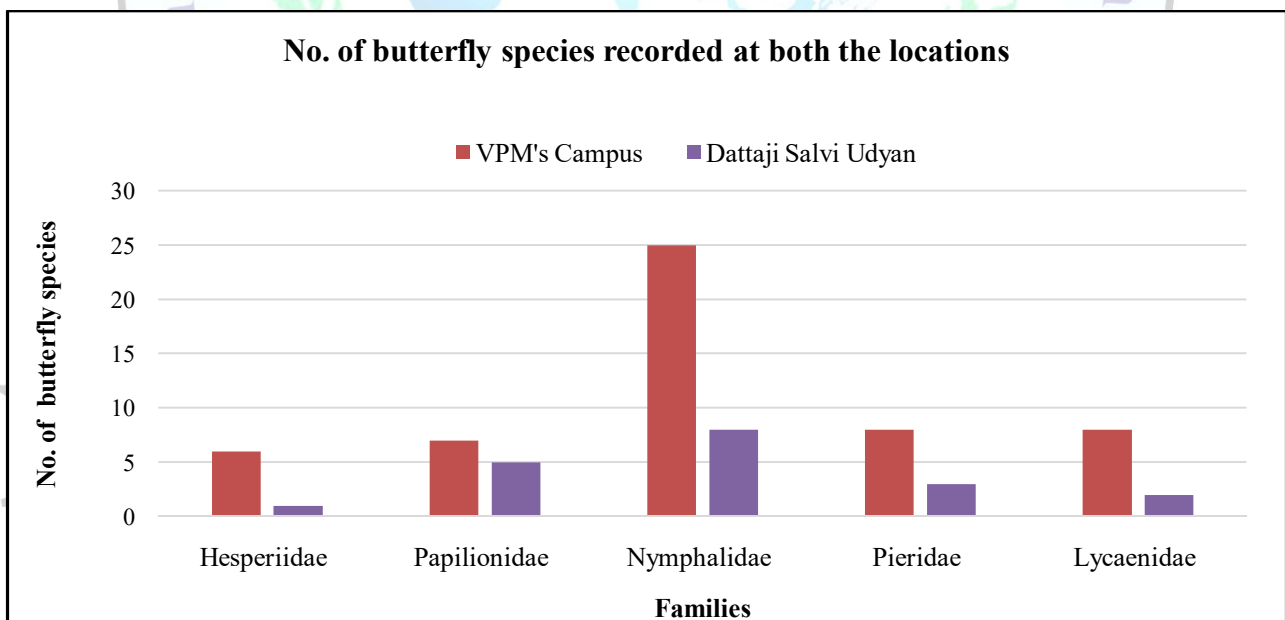


Fig. 1. Graphical representation of butterfly species recorded at both the locations

Table 3. List of common host plant species (nectar and fodder plants) in both the areas.

Sr. No.	Common Plant name	Scientific Name	Family
1	Spider lily	<i>Crinum asiaticum</i> L.	Amaryllidaceae
2	Ghaneri	<i>Lantana camara</i> L.	Verbenaceae
3	Verbena	<i>Verbena officinalis</i> L.	Verbenaceae
4	Jamaican spike	<i>Stachytarpheta indica</i> (L.) Vahl.	Verbenaceae
5	Weeping lavender.	<i>Lantana montevidensis</i> (Spreng.) Briq	Verbenaceae
6	Orange jessamine Kaamini	<i>Murraya paniculata</i> (L.) Jack	Rutaceae
7	Raat rani.	<i>Cestrum nocturnum</i> L	Solanaceae
8	Ixora, Bakora	<i>Ixora coccinea</i> L.	Rubiaceae
9	Rose, Gulab	<i>Rosa spp.</i>	Rosaceae
10	Jasmine, Mogra	<i>Jasminum sambac</i> (L.)	Oleaceae
11	Jasmine, Mogra	<i>Jasminum sambac</i> (L.) Aiton	Oleaceae
12	Paper flower, Bougainvel	<i>Bougainvillea glabra</i>	Nyctaginaceae
13	Hibiscus, Jaswand	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae
14	Peacock flower, Sankasur	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Fabaceae
15	Powder puff plant	<i>Calliandra haematocephala</i> Hassk.	Fabaceae
16	Trailing Daisy	<i>Spagneticola trilobata</i> L.	Asteraceae
17	Marigold, Zendu	<i>Tagetes erecta</i> L.	Asteraceae
18	Chrysanthemum, Shewanti	<i>Chrysanthemum indicum</i> L.	Asteraceae
19	Tagar	<i>Tabernaemontana divaricata</i>	Apocyanaceae
20	Oleander, Kanher	<i>Nerium oleander</i> L.	Apocyanaceae
21	Periwinkle, Sadafuli	<i>Catharanthus roseus</i> (L.) G. Don	Apocyanaceae
22	Devils Tree, Saptaparni	<i>Alstonia scholaris</i> R. Br.	Apocyanaceae
23	Senna tora	<i>Cassia tora</i> L.	Leguminosae
24	Kassod tree	<i>Cassia siamea</i> Lam.	Leguminosae
25	Golden shower tree	<i>Cassia fistula</i> L.	Leguminosae
26	Tamarind, chinch	<i>Tamarindus indica</i> L.	Leguminosae
27	Vilayati chinch	<i>Pithecellobium dulce</i> Roxb.	Leguminosae
28	Rattlepod	<i>Crotolaria retusa</i> L.	Leguminosae
29	Sugar apple	<i>Annona squamosa</i> L.	Annonaceae

30	Mango tree	<i>Mangifera indica</i> L.	Anacardiaceae
31	Rangoon creeper	<i>Combretum indicum</i> L.	Combretaceae
32	Sheep potato	<i>Ruellia tuberosa</i> L.	Acanthaceae
33	Willow leaved-justicia	<i>Justicia gendarussa</i> Burm.f.	Acanthaceae
34	Meswak	<i>Salvadora persica</i> L.	Salvadoraceae
35	Panphuti	<i>Bryophyllum pinnatum</i>	Crassulaceae

Conclusion:

VPM campus housing a greater species diversity compared to Dattaji Salvi Udyan can be attributed to the presence of more of fodder and nectar plants on VPM Campus. Secondly, the area cover of the educational campus is also greater than the latter. The campus is situated adjoining a creek and considerable stretch of mangrove vegetation, the Udyan, on the other hand, is almost surrounded on all sides by urban areas (residential zones and eastern express highway) becoming an island, thus limiting entry of certain species. Change in host plant composition has caused a loss in butterfly diversity. Monoculturing of specific plants and spread of invasive plants have led to certain species becoming dominant, inversely affecting the species richness. Nymphalidae remains the largest representing family with nearly one-third of known butterfly species. A large amount of work remains to be done in such biodiversity rich areas in cities and towns.

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