Recent study on butterfly diversity at Jnandweepa, V.P.M. campus, Thane, Maharashtra

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Abstract : Thane, a sister city of Mumbai, shows variety of ecosystems that provides suitable habitat for diverse fauna. The study area, "Jnandweepa" (college campus) is located on the edge of thane creek with mangroves on the periphery and well maintained garden with variety of plants species in 13.5 acre area providing natural habitat for biodiversity. In the present study, diversity of butterflies and their resources such as food plants within the college campus were studied. 52 species of butterflies were recorded with Nymphalideae showing dominance over other 4 families with 22 species, followed by Pierideae and Lycinideae with 10 species each, Papilionideae with 7 and Hespirideae with 3 species. The survey of plants showed around 30 species of larval food plants which justifies the diversity of butterflies. The survey also recorded some uncommon species such as Black Rajah and Common Palmfly in the campus which were not found in the earlier reports. Their presence can be attributed to newly introduced plant species during horticultural and gardening activities.

Key words : "Jnandweepa", Biological indicators, Larval food Plants,

Introduction

Insects are the dominant group of organisms on earth in terms of both taxonomic diversity (50% of all described species) and ecological function (*Wilson E.O., 1992*). Insects represent the vast majority species in almost all types of ecosystems. Among insects, butterflies have proved to be invaluable flagship species for conservation (*Thomas, 2005*). Butterflies are those members of class Insecta which are not only known for adaptability to habitats but also for magnificent colours and patterns on their wings. India presents extremely diverse terrain, climate and vegetation owing to which, there is tremendous diversity of flora and fauna. India hosts about 1,501 butterfly species, 350 in peninsular India and 333 in the Western Ghats alone (*Gaonkar H. 1996*), from 5 different families, viz., Papilionideae, Pierrideae, Lycinideae, Nymphalideae and Hesperideae. Butterflies being very sensitive towards any type of change in their habitat are considered as excellent Biological Indicators (*Parmesan et al. 1999*). Thus, the butterfly diversity portrays good picture of ecological status of an area.

Study Area

The current study deals with the diversity of butterflies in Vidya Prasarak Mandal's Jnandweep campus, Thane, Maharashtra. Thane city is surrounded by Yeoor hills and Parsik hills. It is also called as Lake City due to the presence of many fresh water lakes. Thane shows such variation in landforms that provides suitable habitat for vast and interesting biodiversity.

Study area is located on the bank of the Thane Creek and at an elevation of 7 m MSL. The campus is unique because of its proximity to the Thane creek on one end and a well maintained garden in the interiors. The study area is thus juxtaposed to mangrove swamps which are characterized by species like *Avicennia marina* and *Avicennia officinalis*, mangrove associates like *Salvadora persica, Acanthophora spp.* etc.

Presence of food plants for butterflies acts as an ideal base for flourishing these beautiful insects in the 13.5 acre campus. The campus has mangrove ecosystem and terrestrial ecosystem in close vicinity to each other. The availability of sufficient irrigation water also adds to floral diversity of this area.

Material and Methods:

The garden pathway known as "Jnanpath" (Knowledge Path) of around 750 m which runs along the campus periphery was trailed to record the diversity of butterflies. All Out Search sampling strategy was adopted for the study and every species encountered during the survey was recorded along with activity and nectar/food plant species, if observed nectaring or egg lying.

Identification of the butterfly species on field was confirmed with the help of identification keys, such as Haribal, 2003, Kunte, 2008 and with photographs captured time to time. Identification of plant species was carried out using available literature (*Ingalhallikar, 2009*).

Opportunistic sampling events encountered elsewhere in the campus (other than "Jnanpath") were also recorded and considered for the study. The study was carried out from November 2012 to October 2013.

Results and Discussion

The study has focused on collecting fundamental

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information on change in diversity of butterfly and their resources such as larval food plants within the college campus. The diversity and abundance of species is highly correlated with the availability of food plants in the surroundings (*Kunte, 2000*). The variety of food plants documented at the study location in fairly good.

Similar study has been carried out in 2002-03 (*Kurve and Pejaver, 2004*), in 2005 (*Kurve and Patwardhan*, 2005) and in 2008 (*Patwardhan and Kurve*, 2008) on the same campus. In the present study, change in the diversity over a period of almost 10 years, was assessed for comparative aspect.

During the survey 52 species were recorded. Their family wise distribution is represented in Table: 1. Previous studies of 2002-03, 2005 and 2008 have revealed 41 species, 48 species and 56 species respectively from 5 different families.

In the present study, 52 species of butterflies were identified from 5 families. Butterflies from family Nymphalideae showed maximum species diversity dominance with 22 species followed by family Pierideae and Lycinideae both represented by 10 species each. 7 species belonging to the family Pappilionideae were seen and the least number of species 3 were recorded from the family Hesperideae (Fig: 1 and Table: 1).

When a survey of the food plants was conducted, it was seen that maximum species belonging to the family Caesalpinae followed by Malvaceae. There were 27 species of food plants in the campus which accounts for the diversity of butterflies. The common plants like *Ficus spp. Cocos nucifera* among many others flourished at many places within the campus. Monsoon allows a variety of herbaceous food plants to grow abundantly. Food plants include *Polyalthia longifolia, Michelia champaka, Citrus spp. Bryophyllum spp.* among many others. The nectar plant species include *Lantana camara, Tridax spp, Verbina spp. Vernonia spp.*

Recent developments like gardening and horticultural activities have also added to the flora of the college campus. Few of these plants are food plants of butterflies. For example, horticultural palm species and Coconut trees are food plants for larvae of Common Palmfly. This butterfly was commonly seen in College campus during present study; which was absent during previous studies. Yet, the decline in diversity of butterfly species could be due to infrastructural development in the campus.

Black rajah (regarded as 'Not Rare' by Evans (1932) and Wynter Blyth (1957)), was regularly recorded in campus probably because of the presence of the food plant, *Tamarindus indicus* in campus. It was also frequently observed on ripe pods of *Cassia fistula.*

However; as the maximum number of species of butterflies found in the study area belong to the family Nymphalidae whose food plants generally belong to the family Acanthaceae (*Kunte, 2008*). The observation shows that, though the number of plant species belonging to family Caesalpinae is high the abundance of the species from the family Acanthaceae is better. This justifies the higher occurrence of butterfly species from family Nymphalideae.

Table: 1. Family wise distribution of Butterfly species in college campus

Sr No.	Papilionideae	Pierideae	Lycinideae	Nymphalideae	Hespirideae
1	Tailed jay	Common grass yellow	Common cerulean	Peacock pansy	Grass demon
2	Common Jay	Common jezebel	Common pierrot	Grey pansy	Indian skipper
3	Common Bluebottle	Common emigrant	Red pierrot	Lemon pansy	Swift
4	Lime	Psyche	Tiny grass blue	Chocolate pansy	---
5	Common Mormon	Salmon arab	Gram blue	Black rajah	---
6	Blue Mormon	Yellow orange tip	Indian sunbeam	Common leopard	---
7	Common rose	White orange tip	Dark cerulean	Great eggfly	---
8	---	Mottled emigrant	Hedge blue	Danaid eggfly	---
9	---	Common wanderer	Oriental plain cupid	Common sailer	---
10	---	Common albatros	Indian cupid	Painted lady	---

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11		---	---	---	Common castor	---
12		---	---	---	Angled castor	---
13		---	---	---	Common baron	---
14		---	---	---	Common crow	---
15		---	---	---	Plain tiger	---
16		---	---	---	Blue tiger	---
17		---	---	---	Striped tiger	---
18		---	---	---	Common evening brown	---
19		---	---	---	Palm fly	---
20		---	---	---	Baronet	---
21		---	---	---	Tawny Coster	---
22		---	---	---	Commander	---

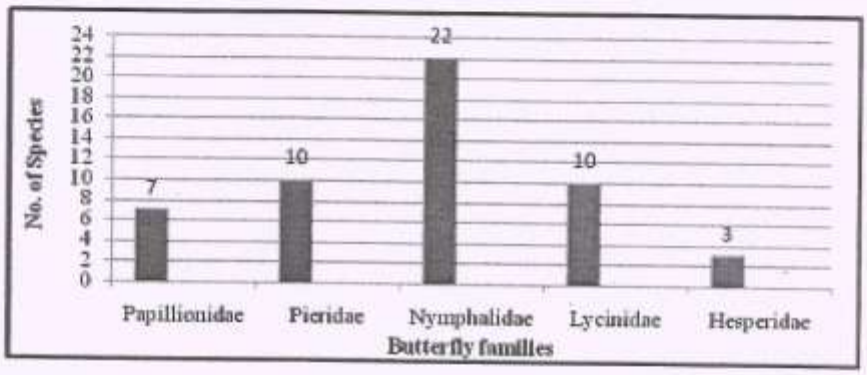

Fig: 1

Table: 2 List of food plants in campus

Sr No	Plant species	Family	Food Plant
1	*Ancardium occidentale*	Anacardiaceae	Common Barron
2	*Annona squamosa*	Annonaceae	Common Jay, Tailed Jay
3	*Aristolochia indica*	Aristolochiaceae	Common Rose
4	*Bombax ceiba*	Bombaceae	Common Sailer
5	*Bryophyllum spp.*	Euphorbiaceae	Red pierot
6	*Caesalpinea spp.*	Caesalpiniaceae	Common grass yellow
7	*Calotropis gigantea*	Asclepiadeacea	Blue tiger, Plain Tiger
8	*Camara lantana*	Verbenaceae	Tiny Grass blue
9	*Cassia fistula*	Leguminosae	Common Emigrant, Mottled emigrant Common grass yellow
10	*Cassia siamia*	Leguminosae	Common Emigrant
11	*Cassia tora*	Leguminosae	Common Emigrant, Mottled emigrant, Common grass yellow

12	*Citrus spp.*	Rutaceae	Lime, Common Mormon
13	*Ficus racemosa*	Moraceae	Common Indian Crow
14	*Hibiscus spp*	Malvaceae	Danid eggfly, Indian Skipper
15	*Mangifera indica*	Anacardiaceae	Common Barron
16	*Michelia champaka*	Magnoliaceae	Common Jay, Tailed Jay
17	*Nerium indicum*	Euphorbiaceae	Common crow
18	*Passiflora spp.*	Passifloraceae	Tawny Coster
19	*Polyalthia longifolia*	Annonaceae	Common Bluebottle, Tailed jay
20	*Ricinus communis*	Euphorbiaceae	Common Castor, Angled Castor
21	*Rosa spp.*	Rosaceae	Common Barron
22	*Salvadora persica*	Salvadoraceae	Salmon arab
23	*Saraca asoca*	Annonaceae	Common Cerulean
24	*Sida Spp.*	Malvaceae	Lemon Pansy, Indian Skipper
25	*Vigna spp.*	Fabaceae	Common Sailer, Gram Blue
26	*Zornia spp.*	Fabaceae	Painted Lady
27	*Coccos nucifera*	Palmae	Common Palmfly

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