A Study on Nectar Plant Preference of Butterflies at Juvenile Detention Center, Barasat, West Bengal, India

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ABSTRACT

Nectar is the primary nutrient source for adult butterflies. Plant species vary in their nectar content that may influence the biological attributes of the dependent life forms. Butterflies too differ in the range of available nectar resources for exploitation. Seven flowering plant species were selected in the study area, Kisholoy, Juvenile Detention Center, Barasat, where butterflies visit the most. Data was generated from three individual plants of each of the seven plant species. Each plant individual was observed for scheduled time period in the morning to record the encounters of butterfly species. Thirty eight [38] butterfly species of five [5] families were recorded during the study period. It was found that, the encounter frequencies of butterfly species varied for different nectar plant species. It was also observed that butterflies of a particular family preferred a specific nectar plant species or even a particular plant of a selected species. None of the seven nectar plants did attract members of all the five butterfly families. Lycaenids were found to be the most frequent visitors in different nectar plants like *Aerva lanata*, *Acmella uliginosa* and *Sida* sp. In case of *Mikania micrantha*, nymphalids were frequent visitors following lycaenids.

Keywords: Butterfly, Nectar, Plant Preference, West Bengal

1. INTRODUCTION

Lepidoptera is the second largest order in the class Insecta and constitutes an important component of terrestrial biodiversity (New and Collins, 1991). In entire life cycle, butterflies mostly depend on two types of plants: host plants and nectar plants. Caterpillars feed on the foliage of their particular host plant species and adult butterflies feed on nectar from flowers of certain plants (Nimbalkar *et al*., 2011). However, caterpillars are often limited to a single host plant, but adult butterflies utilize a wide variety of plant species for their nectar resources. Nectar, the primary nutrient for adult butterfly varies in plant species both in its carbohydrates and constituent components that may affect fecundity (Romeis and Wäckers, 2002). Therefore, both quality and quantity of nectar has direct bearing on the occurrence, distribution and density of different utterfly species (Fothergill and Vaughn, 2009). Butterflies are the potential taxa for biodiversity conservation. They have enormous ecological importance. After bees, butterflies are the second category of insects which are very specific to their food plants. Presence of butterflies indicates healthy habitat enriched with flowering plants whereas diminishing number of butterflies indicates disturbed habitat (Roy *et al*., 2012; Mukherjee *et al*., 2015) and the presence of grass butterflies indicates complete conversion of forests into an agricultural ecosystem (Borges *et al*., 2003). Hence, documentation of butterfly species, their occurrence and characteristics may provide crucial information on the ecology of a particular region. The present study was carried out in a suburban area [Kisholoy, Juvenile Detention Center, Barasat] to understand nectar plant preference of some butterflies and to find out if nectar plant choice for a particular butterfly family is similar or not.

2. MATERIALS AND METHODS
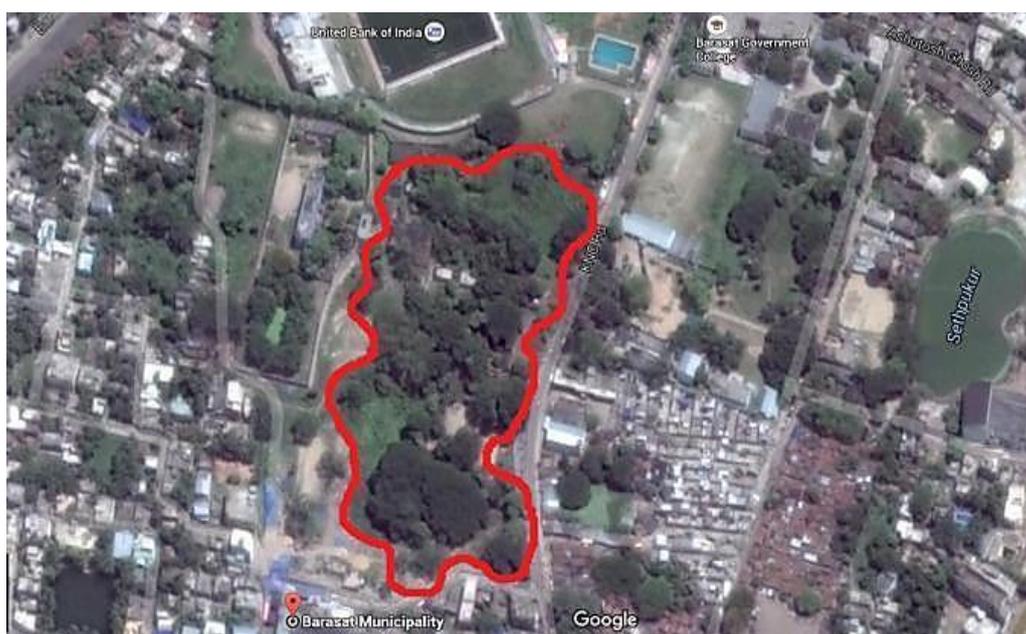
2. 1. Study Area

Figure 1. Map of the study site: Kisholoy, Barasat

The overall study was carried out in Kisholoy (Juvenile Detention Center), near Vidyasagar Krirangan, Barasat (22.72° N, 88.48° E). The area is a mixed habitat comprising different types of marshy plants, shrubs, trees and scattered human settlements.

2. 2. Study Period

The study was conducted from November 2015 to April 2016. The data was recorded by personal observation for three [3] hours in the morning from 8:00 AM to 11:00 AM.

2. 3. Methods of Study

Seven flowering plant species were selected from the entire study area (10,400 m^2), where butterflies visit the most. Three [3] individuals of each plant species were tagged. A single plant was observed for 5 minutes followed by a 5 minutes interval. Every single visit of each butterfly species was counted within the 5 minutes observation time. The butterfly species were identified by visual observations and photo shots. The identification of butterfly species was confirmed with the help of "The Book of Indian Butterflies (Kehimkar, 2008)". The nectar plant species were identified by Botanical Survey of India, Kolkata.
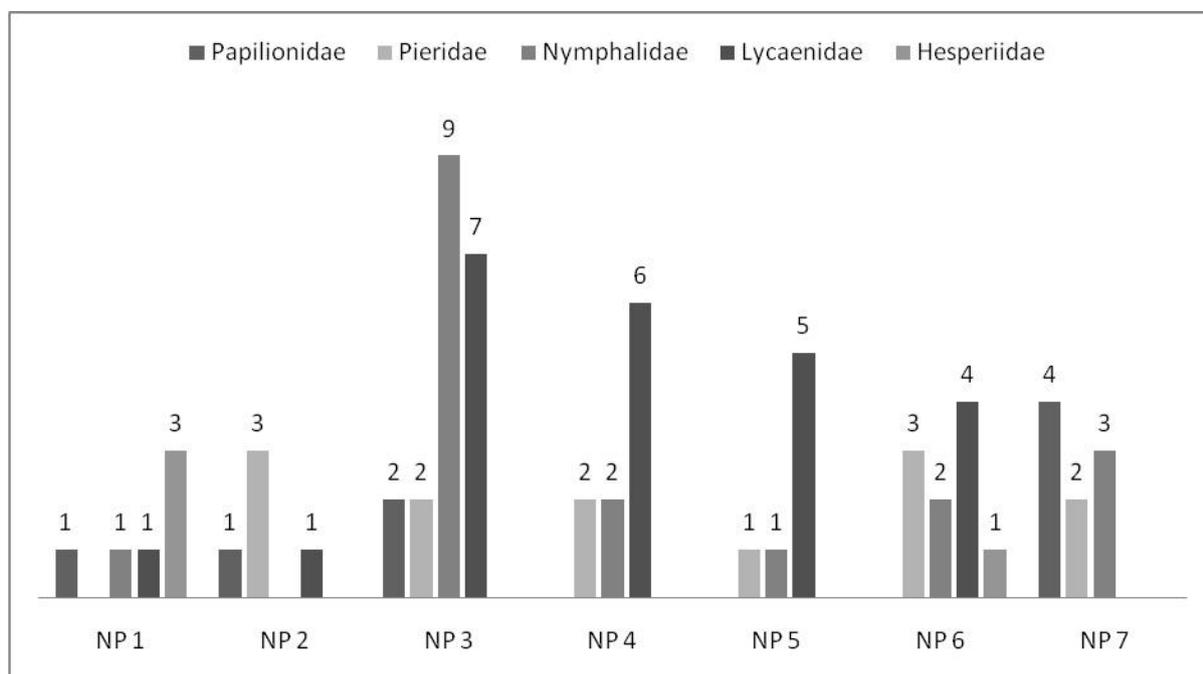
3. RESULTS

Figure 2. No of Butterfly species of the five families on the seven nectar plant under study

Altogether sixteen [16] types of plant species (excluding trees) were found in the study area. Among those plants some were important host plants for butterflies like *Ricinus communis* (host: Common Castor), *Cassia sophera* (host: Mottled Emigrant), *Glycosmis pentaphylla*

(host: Common Mormon, Lime butterfly) etc. However, for the present study, seven [7] flowering plant species namely *Luffa* sp. (NP1), *Urena lobata* (NP2), *Mikania micrantha* (NP3), *Aerva lanata* (NP4), *Acmella uliginosa* (NP5), *Sida* sp. (NP6), *Clerodendrum infortunatum* (NP7) were elected where butterfly visits were more. Total of thirty eight [38] butterfly species of five [5] families were recorded from the area. It was found that the encounter frequencies of the butterfly species vary for different nectar plant species. It was also observed that butterflies belonging to a particular family preferred a specific nectar plant species or even a particular plant of a selected species.

Table 1. Butterfly species found on the seven nectar plant and their visit number

Sl. No.	Species	*Luffa* sp.	*Urena lobata*	*Mikania micrantha*	*Aerva lanata*	*Acmella uliginosa*	*Sida* sp.	*Clerodendrum infortunatum*
1.	Common Pierrot		1	15	3	27	4	
2.	Plains Cupid			31	6	8		
3.	Eastern Striped Albatross		13	3	1		7	7
4.	Common Jezebel		12					19
5.	Plain Tiger			5	2	6	9	6
6.	Mottled Emigrant		19	2			6	
7.	Parnara Swift spp.	4						
8.	Common Silverline			24				
9.	Tawny Coster			7	11		5	
10.	Common Mormon							21
11.	Pale Grass Blue				2			
12.	Common Grass Yellow					4	13	
13.	Tailed Jay	6	2	5				
14.	Grey Pansy			13				
15.	Common Castor			11				
16.	Blue Tiger	4						5
17.	Gram Blue				4		4	
18.	Common Crow			5				2
19.	Lime Blue			4		3		
20.	Common Mime							6
21.	Tiny Grass Blue						6	

No.	Name							
22.	Common Rose							4
23.	Slate Flash			4				
24.	Pierrot (*Tarucus* sp.)					4		
25.	Small Branded Swift	10					16	
26.	Lime Butterfly							3
27.	Great Eggfly			3				
28.	Peacock Pansy			3				
29.	Commander			3				
30.	Common Ciliate Blue	3						
31.	Common Leopard			2				
32.	Psyche				2			
33.	Pointed Ciliate Blue			2				
34.	Pea Blue				2			
35.	Dark Grass Blue				8	2	9	
36.	Common Dartlet	2						
37.	Common Jay			1				
38.	Common Red Flash			1				

3. 1. Nectar Plant Species:

A total of seven [7] nectar plant species were identified in the study area. Most of them were shrubs like *Urena lobata* (1.5 m height) and *Clerodendrum infortunatum* (maximum 4 m in height). Some were climbers like *Luffa* sp. and Mikania *micrantha.* Others were herbs like *Sida* sp., *Acmella uliginosa* and *Aerva lanata.*

Luffa sp., *Aerva lanata* and *Clerodendrum infortunatum* belong to family Cucurbitaceae, Amaranthaceae and Lamiaceae respectively. *Urena lobata* and *Sida* sp. are under the family Malvaceae, while *Mikania micrantha* and *Acmella uliginosa* are under Asteraceae. *Urena lobata* and *Mikania micrantha* are invasive plant species whereas others are native.

4. DISCUSSION & CONCLUSIONS

Butterflies do not feed indiscriminately. They show preference for certain nectar flowers with specific chemical composition (Tiple *et al*., 2006, Nair *et al*., 2014; Mukherjee *et al*., 2015). Flowers with a narrow corolla tube and flat rim characterize typical butterfly flowers. Although butterflies utilize both tubular and non tubular flowers, they show a strong preference for tubular flowers. Further, most of the plant species produce trace amount of nectar but

produce numerous flowers on daily basis at plant level (Tiple *et al.*, 2006; Nimbalkar *et al.*, 2011). Butterflies need carbohydrates and low level of some other compounds such as amino acids, lipids and fats for their fertility, longevity and daily oviposition (Romeis and Wäckers, 2002). The diversity of butterflies for particular habitat is associated with the availability of larval host plants and adult nectar plants (Kunte, 2000). Many of the flowering plants are used by butterflies as nectar plants and support a rich diversity of butterflies.

In the present study, it was found that the encounter frequencies of butterfly species varied for different nectar plant species. It was also observed that butterflies belonging to a particular family preferred a specific nectar plant species raven a particular plant of a selected species. None of the seven necta plants attracted members of all the five butterfly families. Nymphalids were encountered most (with maximum number of butterfly species) on *Mikania micrantha*. The number of visit of butterfly pecies of Lycaenidae was found to be highest in three nectar plants, *Aerva lanata*, *Acmella uliginosa* and *Sida* sp. *Clerodendrum infortunatum* attracted various butterfly species of three families (Papilionidae, Pieridae, Nymphalidae) almost equally. Members of Hesperiidae was found to be an abundant visitor of *Luffa* sp. Common Red Flash butterfly appears to be first record from the area (Mukhopadhyay *et al.*, 2015).

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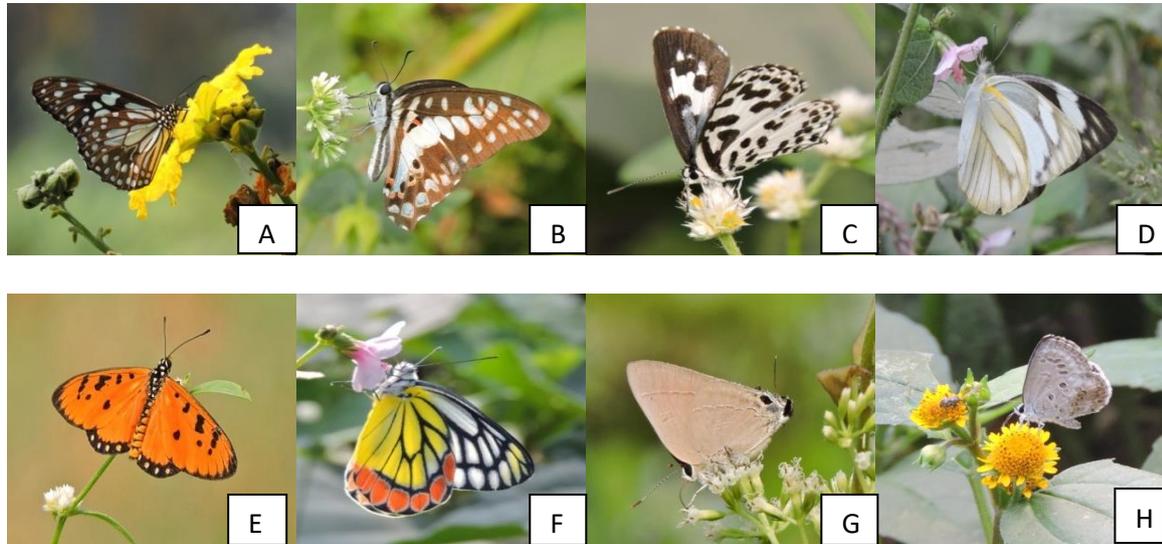
Figure 3. Some of the representative butterfly species encountered during the study period:
A. Blue Tiger; B. Common Jay; C. Common Pierrot; D. Eastern Striped Albatross;
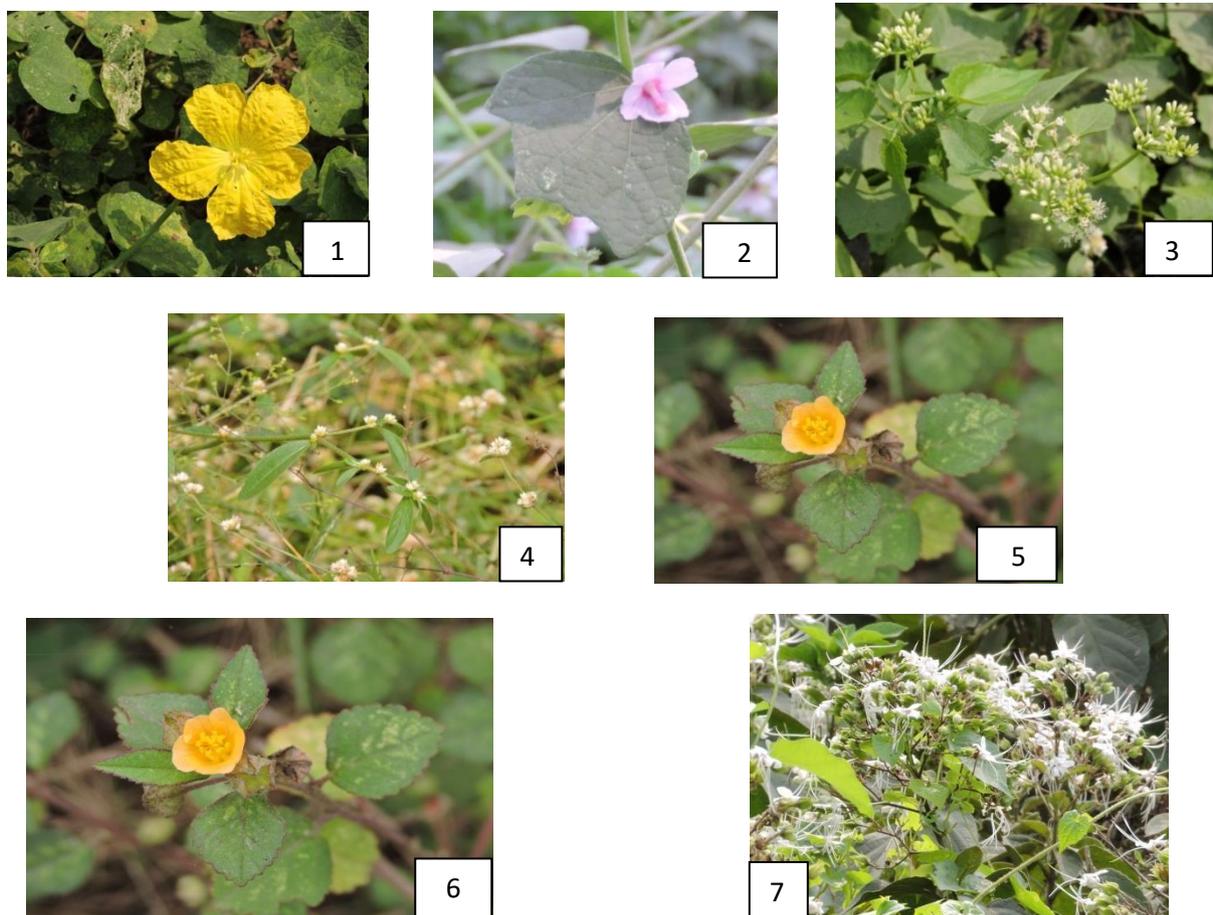E. Tawny Coster; F. Common Jezebel; G. Common Red Flash; H. Lime Blue.

Figure 4. Nectar plant species under study: 1. *Luffa* sp.; 2. *Urena lobata*; 3. *Mikania micrantha*; 4. *Aerva lanata*; 5. *Acmella uliginosa*; 6. *Sida* sp.; 7.*Clerodendrum infortunatum.*