

## **Butterfly pollinator preferred on the nectar food plants in magway environs, magway region, Myanmar**

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### **Abstract**

The investigation of agents of adult butterfly pollinator on nectar food plants was conducted in Magway Township during June 2014 to April 2015. A total of 50 species in 5 families were recorded. The highest percentage was found in family Nymphalidae 20 species (40%) followed after Pieridae 14 species (28%), Lycaenidae 7 species (14%), Papilionidae 6 species (12%) and Hesperidae 3 species (6%) were recorded. In family Papilionidae, generalist (4) and specialist (2), in Pieridae, generalist (10) and specialist (4), in Nymphalidae generalist (7) and Specialist (13), in Lycaenidae generalist (6) and specialist (1), in Hesperidae, generalist (2) and specialist (1) were recorded. A total of 23 plant families of 48 species were used by butterflies as nectar food plants. In this study, the butterflies are conserved with their references nectar food plants in Magway environs.

**Keywords:** butterfly species, nectar food plant

### **1. Introduction**

Butterflies are essential part of any natural ecosystem as their adults perform pollination and larvae enact as primary herbivores thereby transferring radiant energy trapped by plants to the next trophic level; rendering dual roles as pollinators and as energy transfers. The holometabolus life history of butterflies exposes them to a wide range of environmental influences. They are highly sensitive to changes in temperature, humidity and light; parameters that are easily influenced by habitat deterioration [1]. Therefore, butterflies are good indicator species to monitor ecological changes in a habitat [2].

Feeding is a significant activity and food may often be the most decisive factor affecting distribution, abundance and movements of animals. In butterflies, this has a special relevance because food and mode of feeding are different in the larval and adult stages [3].

The nectar from flowers as a source of food for adult butterflies, since for the majority their life is short and sweet, literally, the nectar acting purely as source of energy for that short period of intense activity encompassing finding a mate, mating and egg-laying [4].

The natural vegetation consisting of trees, shrubs, herbs and climbers were observed to find out the food resource of butterflies, in different seasons [5]. A tree, botanically, is defined as a woody plant with numerous secondary branches supported clearly off the ground on a main stem (called trunk) and with conspicuous apical dominance. Unlike a tree, a shrub is much shorter (never more than 8 m tall) and lacks a primary stem or trunk. Shrubs are usually quite messy, with many secondary branches. Herbs are non-woody flowering plants. Commonly, a herb is a plant that is usually cultivated for economical gains by means of selling its parts (particularly flowers, leaves, seeds, and sometimes stem). Herbs are quite small in size (usually not more than several feet off the ground) [6].

Butterflies are said to interact with agriculture. Many adult butterflies visit flowers for nectar and aid in pollination of plant [7]. They play the role of pollinators while gathering pollen and nectar from the flowering plants as their source of food. A few butterflies also feed on pollen along with nectar and pollen may form a more important part of their diet. Pollen is rich in proteins and also acids and therefore it has an important role to play in a butterfly's life [3]. They are also indicators of environmental quality and are appreciated for their aesthetic values [8].

In the present investigation, the preference of nectar food plants of some butterflies was focused in a florally rich area of Magway. Thus, this research aimed to investigate the nectar food plants utilized by butterfly species, to study the nectar food plants preferred by each butterfly species.

### **2. Materials and Methods**

#### **2.1 Study area and study sites**

This study was carried out from June 2014 to May 2015 in Magway environs. It lies in the Dry Zone of Central Myanmar, which has dry and hot climate. It has an area of 1098.37 km<sup>2</sup>. It is situated between 20°06' 41.13"N to 20°10' 11.33" N and 94°55' 03.32"E to 94°57' 02.96" E. Five study sites were chosen on the basis of topography and ecological habitats.

**Site (I) Myinkin Village:** It is situated at the Southwest part of Magway and lies between Latitude 20° 07' 0.09" to 20° 07' 11.76" N and Longitude 94° 56' 11.8" to 94° 56' 29.42" E. This study site includes grassy land, tall and medium trees, shrubs, paddy fields and other cultivated fields.

**Site (II) Magway University Campus:** It is located at nearly Southern part of Magway and lies between Latitude 20° 07' 56.57" to 20° 08' 21.17" N and Longitude 94° 55' 50.42" to 94° 56' 21.39" E. This site has various flowering plants, cultivated fields, shrubs, grassy land, large trees and medium-sized plants.

**Site (III) Lut Lat Yae Park:** This study site is situated at the Southwest part of Magway and lies between Latitude 20° 8' 31.85" to 20° 8' 41.46" N and Longitude 94° 55' 24.70" to 94° 55' 29.37"E. It is composed of various flowering plants, shrubs, herbs, grassy lands, medium and tall trees and it is also abundant with moist shady places.

**Site (IV) Myathalon Area:** This study site is situated at the Northwest part of Magway and it is along the Ayeyawady River bank where the Myathalon Pagoda is built. It lies between Latitude 20 ° 19' 00" to 20°10' 18.19" N and Longitude 94° 55' 0.29" to 94 ° 55' 9.06" E. There are bushes, grassy land, wild flowering plants, and cultivated lands, tall and medium trees in this area.

**Site (V) Nagu village:** This study site is situated at the Southeast part of Magway and lies between Latitude 20° 8' 12.50" to 20° 8' 26.52" N and Longitude 94° 57' 34.5" to 94° 57' 53.16" E. It is represented with orchard, cultivated land, shrubs, grassy land and trees.

**2.2 Plants species and butterfly visitation census**

Data on butterfly visit on the plants in the study were determined by direct observations. Observation on the visits of adult butterflies on nectar food plants was made walking along the established transect routes. Nectar food plants are recorded four vegetation types according to Kress *et al.* [9]. Data collections were made twice a month at each of first and third week during 8:00 am to 12:00 pm and 1:00 am to 6:00 pm. When butterflies are sucking nectar on their food plants, the butterfly species and the kind of food plant were recorded. If the nectar food plants were hard to identify in the field, necessary parts of plant that are useful in the identification were taken and brought to the Department of Botany, University of Magway for identification.

**2.3 Identification of butterfly and nectar food plant species**

The butterfly species were identified according to Bingham [10, 11], Talbot [12], Cobert and Plendlebury [13] and Kinyon [14]. The nectar food plants were identified with reference to Hundley and Chit Ko Ko [15], Kress *et al.* [9], and Khin Mar Than [16], and confirmed with the academic staff of the Botany Department, Magway University.

**3. Results**

A total of 50 butterfly species belonging to five families were recorded from Magway Township during the study period. the highest percentage of butterfly family Nymphalidae 20 species (40%) followed by Pieridae 14 species (28%), Lycaenidae 7 species (14%), Papilionidae six species (12%) and Hesperidae 3 species (6%) were recorded during the study period (Table 3, Figure 2.1). A total of 23 plant families of 48 species were used by butterflies as nectar food plants. Among the food plants, single plant species from each of family Capparaceae, Crassulaceae, Mimosaceae, Lythraceae, Vitaceae, Anacardiaceae, Sapindaceae, Rubiaceae, Acanthaceae, Verbenaceae, Poaceae and Boraginaceae, two plant species from each of family Amaranthaceae, Cucurbitaceae, Nyctaginaceae, Apocynaceae, Caesalpiniaceae and Euphorbiaceae, three plants species Lamiaceae and Rutaceae four plant species from each of family Malvaceae, five plants species Fabaceae and nine plants species from of the family Asteraceae were included. These vegetation types are herb,

shrub climber and tree. Visits of butterflies were more in herbs (23), followed by shrubs (14), climbers (6) and tree (5) (Table 3.2, Figure 3.2).

The nectar food plants used by butterfly species from five study sites in Magway Township are shown in Table 2. Of these, Site II and III were composed with the highest number of nectar food plants species (28 species, 58.33%) while Site I (20 species, 41.66%) and Site V (19 species, 39.58%) were the least composition. Although Site IV with (23 species, 47.91%) is considered not having the highest number of plant species, the nectar food plants recorded in this site are quite different from other sites (Table 3.2). Among 48 plants species, seven nectar food plants species were recorded from all study sites. They are *Alternanthera punges* Kunth, *Sida rhombifolia* L., *Cleome viscosa* L., *Euphorbia hypericifolia* L., *Catharathus roseus* (L.), *Tridax procumbens* L., *Dactyloctenium aegyptium* (L.). On the other hand, *Gomphrena globosa*, *Hibiscus schizopetalus* Hooks, *Kalanchoe laciniata* (L.) DC, *Lagerstroemia indica* L. and *Zinnia elegans* Jacq, were observed only in Site IV and *Citullus lanatus* (Thunb.) Matsum. & Nakai, *Cucumis sativus* L., *Crotalaria retusa* L., *Tithonia diversifolia* (Hemsl) A. Gray, *Helianthus annuus* L and *Guizotia abyssinica* (L.f) cass in Site III during the study period. *Citullus lanatus* (Thunb.) Matsum. *Cucumis sativus* L, *Helianthus annuus* L, *Guizotia abyssinica* (L.f) cass are only the cultivated plants in the Site III. *Citrus aurantifolium* (Christm) Sw., *Citrus medica* L. *Citrus limon* (L.) Burm. f. are only recorded from the Site V. *Cayratia pedata* (Lam.) Gagnep is only from Site I and *Pterocarpus macrocarpus* Kurz from II (Table 3.2, Figure 3.2). During the course of study, the nectar of *Acrocephalus axillaris* Benth, *Tridax procumbens* L. and *Ixora coccinea* L. may be considered tasty and rich with nutrients for energy source because these nectar food plants were used by many butterfly species. Moreover, *Tridax procumbens* L. was the most utilized nectar food plant by butterfly and their flowering period isthroughout the year. Nectar from *Tridax procumbens* L. species was used by 36 butterfly species from five families. In addition to *Acrocephalus axillaris* Benth was used by 31 butterfly species. *Ixora coccinea* L. was also more preferred by butterflies from family Papilionidae and Pieridae (Table 3.3). A total 50 butterfly species, (29) species are generalist and 21 species are specialist. In family Papilionidae, generalist (4) and specialist (2), in Pieridae, generalist (10) and specialist (4), in Nymphalidae generalist (7) and Specialist (13), in Lycaenidae generalist (6) and specialist (1), in Hesperidae, generalist (2) and specialist (1) were recorded in this study. The number of nectar food plant speices was used to be the highest in family Pieridae 16 nectar food plants species, followed by Nymphalidae 14 species, Papilionidae 11 species, Lycaenidae 11 species and Hesperidae 5 species (Table 3.3, Figure 3.4 and 35).

**Table 3.1:** Composition butterfly species in different family in Magway environs

No.	Family	Genus	Species	Percent composition
1	Papilionidae	4	6	12
2	Pieridae	10	14	28
3	Nymphalidae	12	20	40
4	Lycaenidae	6	7	14
5	Hesperidae	3	3	6
	Total	35	50	

**Table 3.2:** List of nectar food plants used by butterfly species in different study sites of Magway environs

No	Family	Scientific name	Myanmar name		Site I	Site II	Site III	Site IV	Site V
1	Acanthaceae	<i>Ruellia tuberosa</i>	Na ga mine	Herb	-	+	+	+	-
2	Amaranthaceae	<i>Alternanthera punges</i> Kunth.	E-Su	Herb	+	+	+	+	+
3		<i>Gomphrena globosa</i>	Manhyo lone pan	Herb	-	-	+	-	-
4	Anacardiaceae	<i>Mangifera indica</i> L.	Thayet	Tree	+	+	-	-	+
5	Apocynaceae	<i>Catharathus roseus</i> (L.)	Thinbaw manyo	Herb	+	+	+	+	+
6		<i>Ichnocarpus frutescens</i> (L.) R.Br	Taw za pial	Tree	-	+	+	-	-
7	Asteraceae	<i>Cyanthillium cinerea</i> (L.) Less.	Kadu pyan	Herb	-	+	+	+	-
8		<i>Tridax procumbens</i> L.	Hmwe soak	Herb	+	+	+	+	+
9		<i>Tithonia diversifolia</i> (Hemsl) A. Gray	Taung Nay kyar	Herb	-	-	-	+	-
10		<i>Wedelia chinensis</i> (Osbeck) Merr.	Nay kyar gale	Herb	-	+	+	-	-
11		<i>Cosmos sulphureus</i> Cav.	Sein chai kadiba	Herb	-	+	+	-	-
12		<i>Zinnia elegans</i> Jacq.	Khu na htwe pan	Herb	-	-	+	-	-
13		<i>Helianthus annuus</i> L.	Negyaban	Herb	-	-	-	+	-
14		<i>Guizotia abyssinica</i> (L.f) cass	Pan hnan	Herb	-	-	-	+	-
15		<i>Eupatorium odoratum</i>	Bizat	Shrub	+	+	-	+	+
16	Boraginaceae	<i>Heliotropium indicum</i>	Sinnhar maung gyi	Herb	-	+	-	+	-
17	Caesalpiniaceae	<i>Caesalpinia pulcherrima</i> (L.)	Sein pan galay	Tree	+	+	+	+	+
18	Caesalpiniaceae	<i>Senna occidentalis</i> (L.) lonk.	Kazaw boke	Herb	+	+	-	-	+

**Table 3.2:** continued

No	Family	Scientific name	Myanmar name		Site I	Site II	Site III	Site IV	Site V
19	Capparaceae	<i>Cleome viscosa</i> L.	Hin gala	Shrub	+	+	+	+	+
20	Crassulaceae	<i>Kalanchoe laciniata</i> (L.) DC	Mi malaung pan	Herb	-	-	+	-	-
21	Cucurbitaceae	<i>Citullus lanatus</i> (Thunb.)Matsum.& Nakai	Hpaye	Climber	-	-	-	+	-
22		<i>Cucumis sativus</i> L.	Thakhwa	Climber	-	-	-	+	-
23	Euphorbiaceae	<i>Euphorbia hypericifolia</i> L.	Kywe kyung min sae	Herb	+	+	+	+	+
24		<i>Jatropha gossypifolia</i> L.	Thinbaw ka na kho	Shrub	+	-	-	+	-
25	Fabaceae	<i>Pterocarpus macrocarpus</i> Kurz	Pa dauk	Tree	-	+	-	-	-
26		<i>Clitoria ternatea</i> L.	Aung me nyo	Herb	+	+	-	-	-
27		<i>Tephrosia purpurea</i> Pers.	Mae yaing	Herb	-	+	-	+	+
28		<i>Crotalaria retusa</i> L.	Pyit sen shawe	Shrub	-	-	-	+	-
29		<i>Dolichos lablab</i> L.	Pebizat	Climber	+	-	-	+	+
30	Lamiaceae	<i>Acrocephalus axillaris</i> Benth	Sein-na-gut	Herb	+	-	-	+	-
31		<i>Leucas cephalotes</i> (Roth) Spreng	Pin gu hteik gyi	Herb	-	+	-	+	+
32		<i>Hiptis suaveolens</i> (L.) Poit.	Taw pin sein	Shrub	+	+	-	+	+
33	Lythraceae	<i>Lagerstroemia indica</i> L.	Pan e	Shrub	-	-	+	-	-
34	Malvaceae	<i>Hibiscus rosa-sinensis</i> L.	Khaung yang	Shrub	-	+	+	-	-
35	Malvaceae	<i>Hibiscus schizopetalus</i> Hooks	Pan swele	Shrub	-	-	+	-	-
36		<i>Sida rhombifolia</i> L.	Katsi ne	Shrub	+	+	+	+	+

**Table 3.2:** continued

No	Family	Scientific name	Myanmar name		Site I	Site II	Site III	Site IV	Site V
37		<i>Pavonia odorata</i> Willd	Balar	Herb	-	+	-	+	+
38	Mimosaceae	<i>Acacia nilotica</i> (L.) Delile	Suphyu	Tree	+	+	-	-	-
39	Nyctaginaceae	<i>Bougainvillea gabra</i>	Sekku pan	Climber	+	+	+	-	-
40		<i>Commicarpus chinensis</i> (L.)	Payan nawa	Herb	-	-	+	+	-
41	Poaceae	<i>Dactyloctenium aegyptium</i> (L.) P	Myet le gwa	Herb	+	+	+	+	+
42	Rubiaceae	<i>Ixora coccinea</i> L.	Ponna yeik	Shrub	-	+	+	-	-
43	Rutaceae	<i>Citrus aurantifolium</i> (Christm) Sw.	Thanbaya	Shrub	-	-	-	-	+
44		<i>Citrus limon</i> (L.)Burm. f..	Thanbayo	Shrub	-	-	-	-	+
45		<i>Citrus medica</i> L	Shauk	Shrub	-	-	-	-	+
46	Sapindaceae	<i>Cordiospermum canescens</i> Walls.	Kalar myte si gyi	Climber	+	-	-	+	-
47	Verbenaceae	<i>Duranta repens</i> L.	Bokadaw myet hkon	Shrub	-	+	+	+	-
48	Vitaceae	<i>Cayratia pedata</i> (Lam.) Gagnep	Unknow	Climber	+	-	-	-	-
		Total			20	28	23	28	19

+ = present, - = absent

**Table 3.3:** List of nectar food plants used by each of butterfly species in Magway environs

No	Family	Scientific name of butterfly	Scientific name of nectar food plants	no. of plant species
1	Papilionidae	<i>Pachliopta aristolochiae</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Ixora coccinea</i> L., <i>Tridax procumbens</i> L., <i>Caesalpinia pulcherrima</i> (L.), <i>Catharathus roseus</i> (L.), <i>Bougainvillea gabra</i> , <i>Tithonia diversifolia</i> (Hemsl) A. Gray,	7
2		<i>Papilio demoleus</i> *	<i>Tithonia diversifolia</i> (Hemsl) A. Gray., <i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Ixora coccinea</i> L., <i>Pterocarpus macrocarpus</i> Kurz, <i>Catharathus roseus</i> (L.), <i>Caesalpinia pulcherrima</i> (L.), <i>Zinnia elegans</i> Jacq., <i>Bougainvillea gabra</i> , <i>Citrus medica</i> L <i>Helianthus annuus</i> L.	11
3		<i>P. polytes</i> *	<i>Ixora coccinea</i> L., <i>Pterocarpus macrocarpus</i> Kurz, <i>Catharathus roseus</i> (L.), <i>Acrocephalus axillaris</i> Benth., <i>Hibiscus rosa-sinensis</i> L, <i>Citrus medica</i> L. <i>Helianthus annuus</i> L.	7
4		<i>P. memnon</i> **	<i>Ixora coccinea</i> L., <i>Hibiscus rosa-sinensis</i> L, <i>Catharathus roseus</i> (L.)	3
5		<i>Graphium doson</i> **	<i>Ixora coccinea</i> L.	1
6		<i>G. agamemnon</i> *	<i>Tridax procumbens</i> L., <i>Ixora coccinea</i> L., <i>Zinnia elegans</i> Jacq., <i>Acrocephalus axillaris</i> Benth, <i>Kalanchoe laciniata</i> (L.) DC	5
7	Pieridae	<i>Delias hyparete</i> **	<i>Citrus limon</i> (L.)Burm. f.	1
8		<i>Leptosia nina</i> *	<i>Tridax procumbens</i> L., <i>Ageratum conyzoides</i> Linn, <i>Commicarpus chinensis</i> (L.), <i>Acrocephalus axillaris</i> Benth,	4
9		<i>Cepora nerissa</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Ixora coccinea</i> L.	4
10		<i>Appias libythea</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Ixora coccinea</i> L., <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Duranta repens</i> L., <i>Cordiospermum canescens</i> Walls., <i>Cleome viscosa</i> L. <i>Tithonia diversifolia</i> (Hemsl) A. Gray, <i>Gomphrena globosa</i> , <i>Cayratia pedata</i> (Lam.) Gagnep	10
11		<i>A. albina</i> **	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Sida rhombifolia</i> L.	3
12		<i>Ixias pyrene</i> *	<i>Tithonia diversifolia</i> (Hemsl) A. Gray., <i>Pavonia odorata</i> Willd, <i>Acrocephalus axillaris</i> Benth., <i>Cleome viscosa</i> L., <i>Tridax procumbens</i> L. <i>Ixora coccinea</i> L., <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Pterocarpus macrocarpus</i> Kurz, <i>Duranta repens</i> L., <i>Hibiscus rosa-sinensis</i> L, <i>Hibiscus schizopetalus</i> Hooks, <i>Zinnia elegans</i> Jacq., <i>Caesalpinia pulcherrima</i> (L.), <i>Cosmos sulphureus</i> Cav., <i>Acacia farnesiana</i> (L.) Willd, <i>Tephrosia purpurea</i> Pers, <i>Hiptis suaveolens</i> (L.) Poit.	17

**Table 3.3:** Continued

No	Family	Scientific name of butterfly	Scientific name of nectar food plants	no. of plant species
13		<i>Hebomoia glaucippe</i> **	<i>Ixora coccinea</i> L., <i>Ichnocarpus frutescens</i> (L) R., <i>Bougainvillea gabra</i>	3
14		<i>Pareronia anais</i> *	<i>Sida rhombifolia</i> L., <i>Ixora coccinea</i> L., <i>Hibiscus rosa-sinensis</i> L, <i>Hibiscus schizopetalus</i> Hooks, <i>Catharathus roseus</i> (L.), <i>Ichnocarpus frutescens</i> (L) R., <i>Bougainvillea gabra</i>	7
15		<i>Catopsilia pyranthe</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Cosmos sulphureus</i> Cav., <i>Ixora coccinea</i> L. <i>Hibiscus rosa-sinensis</i> L, <i>Pterocarpus macrocarpus</i> Kurz, <i>Duranta repens</i> L., <i>Zinnia elegans</i> Jacq., <i>Caesalpinia pulcherrima</i> (L.), <i>Cordiospermum canescens</i> Walls. <i>Ichnocarpus frutescens</i> (L) R., <i>Acacia farnesiana</i> (L.) Willd, <i>Sida rhombifolia</i> L., <i>Gomphrena globosa</i> <i>Hiptis suaveolens</i> (L.) Poit., <i>Bougainvillea gabra</i> , <i>Tithonia diversifolia</i> (Hemsl) A. Gray	17
16		<i>C. pomona</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Cosmos sulphureus</i> Cav., <i>Ixora coccinea</i> L., <i>Hibiscus rosa-sinensis</i> L, <i>Pterocarpus macrocarpus</i> Kurz, <i>Duranta repens</i> L., <i>Zinnia elegans</i> Jacq., <i>Caesalpinia pulcherrima</i> (L.), <i>Ichnocarpus frutescens</i> (L) R., <i>Eupatorium odoratum</i> , <i>Acacia farnesiana</i> (L.) Willd, <i>Cordiospermum canescens</i> Walls., <i>Sida rhombifolia</i> L., <i>Hiptis suaveolens</i> (L.) Poit., <i>Bougainvillea gabra</i> , <i>Tithonia diversifolia</i> (Hemsl) A. Gray	17
17		<i>Eurema hecabe</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Jatropha gossypifolia</i> L., <i>Sida rhombifolia</i> L., <i>Cleome viscosa</i> L. <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Tridax procumbens</i> L. <i>Tephrosia purpurea</i> Pers., <i>Commicarpus chinensis</i> (L.), <i>Catharathus roseus</i> (L.), <i>Hibiscus rosa-sinensis</i> L, <i>Hiptis suaveolens</i> (L.) Poit., <i>Pavonia odorata</i> Willd, <i>Tithonia diversifolia</i> (Hemsl) A. Gray, <i>Kalanchoe laciniata</i> (L.) DC	14
18		<i>E. simulatrix</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Cleome viscosa</i> L., <i>Tridax procumbens</i> L., <i>Sida rhombifolia</i> L., <i>Commicarpus chinensis</i> (L.)	5
19		<i>E. sari</i> **	<i>Tridax procumbens</i> L., <i>Commicarpus chinensis</i> (L.), <i>Acrocephalus axillaris</i> Benth.,	3
20		<i>Eurema blana</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Cleome viscosa</i> L., <i>Commicarpus chinensis</i> (L.)	4
21	Nymphalidae	<i>Danaus chrysippus</i> *	<i>Crotalaria retusa</i> L., <i>Acrocephalus axillaris</i> Benth., <i>Heliotropium indicum</i> , <i>Leucas cephalotes</i> (Roth) Spreng, <i>Tridax procumbens</i> L., <i>Cosmos sulphureus</i> Cav., <i>Clitoria ternatea</i> L., <i>Guizotia abyssinica</i> (L.f) cass, <i>Tithonia diversifolia</i> (Hemsl) A. Gray, <i>Citullus lanatus</i> (Thunb.) Matsum.& Nakai, <i>Cucumis sativus</i> L., <i>Helianthus annuus</i> L., <i>Dolichos lablab</i> L.	13

Table 3.3: Continued

No	Family	Scientific name of butterfly	Scientific name of nectar food plants	no. of plant species
22		<i>D. genutia</i> *	<i>Crotalaria retusa</i> L., <i>Tridax procumbens</i> L., <i>Acrocephalus axillaris</i> Benth., <i>Heliotropium indicum</i>	4
23		<i>Tirumala limniace</i> *	<i>Crotalaria retusa</i> L., <i>Cosmos sulphureus</i> Cav., <i>Leucas cephalotes</i> (Roth) Spreng, <i>Tridax procumbens</i> L., <i>Zinnia elegans</i> Jacq., <i>Heliotropium indicum</i> , <i>Guizotia abyssinica</i> (L.f) cass, <i>Tithonia diversifolia</i> (Hemsl) A. Gray	8
24		<i>Parantic agleoides</i> **	<i>Hibiscus rosa-sinensis</i> L, <i>Hibiscus schizopetalus</i> Hooks	2
25		<i>Euploe core</i> **	<i>Zinnia elegans</i> Jacq., <i>Cosmos sulphureus</i> Cav., <i>Hiptis suaveolens</i> (L.) Poit.	3
26		<i>Mycalasis perseus</i> **	<i>Euphorbia hypericifolia</i> L.	1
27		<i>Ariadne ariadne</i> **	<i>Tridax procumbens</i> L., <i>Heliotropium indicum</i>	2
28		<i>A. merione</i> **	<i>Tridax procumbens</i> L., <i>Heliotropium indicum</i>	2
29		<i>A. specularia</i> **	<i>Tridax procumbens</i> L., <i>Heliotropium indicum</i>	2
30		<i>Phalanta phalantha</i> **	<i>Tridax procumbens</i> L. <i>Acrocephalus axillaris</i> Benth,	2
31		<i>Cethosia cyane</i> *	<i>Cosmos sulphureus</i> Cav. <i>Duranta repens</i> L., <i>Cordiospermum canescens</i> Walls., <i>Eupatorium odoratum</i> , <i>Acrocephalus axillaris</i> Benth. <i>Citrus aurantifolium</i> (Christm) Sw.	6
32		<i>Junonia atlites</i> **	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L.	2
33		<i>J. almana</i> **	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L.	2
34		<i>Junonia lemonia</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Cosmos sulphureus</i> Cav., <i>Zinnia elegans</i> Jacq., <i>Lagerstroemia indica</i> L. <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Tithonia diversifolia</i> (Hemsl) A. Gray, <i>Gomphrena globosa</i>	8
35		<i>J. orithya</i> **	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L.	2
36		<i>J. hierta</i> **	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L.	2
37		<i>Hypolimnas misippus</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Pterocarpus macrocarpus</i> Kurz, <i>Cosmos sulphureus</i> Cav., <i>Bougainvillea gabra</i>	6

Table 3.3: Continued

No	Family	Scientific name of butterfly	Scientific name of nectar food plants	no. of plant species
38		<i>H. bolina</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Pterocarpus macrocarpus</i> Kurz, <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Cosmos sulphureus</i> Cav., <i>Bougainvillea gabra</i>	6
39		<i>Pantoporia sandaka</i> **	<i>Mangifera indica</i> L.	1
40		<i>Phaedyma collumella</i> **	<i>Ichnocarpus frutescens</i> (L) R., <i>Euphorbia hypericifolia</i> L.	2
41	Lycaenidae	<i>Castalius rosimon</i> **	<i>Tridax procumbens</i> L., <i>Wedelia chinensis</i> (Osbeck) Merr., <i>Guizotia abyssinica</i> (L.f) cass	3
42		<i>Zizeeria karsandra</i> *	<i>Euphorbia hypericifolia</i> L., <i>Acrocephalus axillaris</i> Benth., <i>Tridax procumbens</i> L., <i>Dactyloctenium aegyptium</i> (L.) P, <i>Ageratum conyzoides</i> L. sp.PI.ed, <i>Alternanthera pungens</i> Kunth, <i>Tephrosia purpurea</i> Pers, <i>Ruellia tuberosa</i> , <i>Guizotia abyssinica</i> (L.f) cass, <i>Citrus aurantifolium</i> (Christm) Sw.	10
43		<i>Chilades pandava</i> *	<i>Tridax procumbens</i> L., <i>Tephrosia purpurea</i> Pers., <i>Acrocephalus axillaris</i> Benth., <i>Senna accidentalis</i> (L.) lonk., <i>Guizotia abyssinica</i> (L.f) cass, <i>Cucumis sativus</i> L. <i>Citrus aurantifolium</i> (Christm) Sw, <i>Dolichos lablab</i> L.	8
44		<i>Arhopala aedias</i> *	<i>Tridax procumbens</i> L., <i>Ageratum conyzoides</i> L. sp.PI.ed, <i>Acrocephalus axillaris</i> Benth., <i>Senna accidentalis</i> (L.) lonk.	4
45		<i>Rapala nissa</i> *	<i>Tridax procumbens</i> L., <i>Acrocephalus axillaris</i> Benth. <i>Catharathus roseus</i> (L.), <i>Senna accidentalis</i> (L.) lonk.	4
46		<i>R. airbus</i> *	<i>Cosmos sulphureus</i> Cav., <i>Catharathus roseus</i> (L.), <i>Tridax procumbens</i> L., <i>Senna accidentalis</i> (L.) lonk.	4
47		<i>Tarucus callinara</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Sida rhombifolia</i> L., <i>Tridax procumbens</i> L., <i>Ageratum conyzoides</i> L. sp. PI.ed, <i>Tephrosia purpurea</i> Pers. <i>Dolichos lablab</i> L.	6
48	Hesperiidae	<i>Spialia galba</i> **	<i>Leucas cephalotes</i> (Roth) Spreng, <i>Catharathus roseus</i> (L.), <i>Duranta repens</i> L.	3
49		<i>Baoris farri</i> *	<i>Leucas cephalotes</i> (Roth) Spreng, <i>Duranta repens</i> L., <i>Catharathus roseus</i> (L.), <i>Eupatorium odoratum</i> , <i>Tridax procumbens</i> L.	5
50		<i>Caltoris brunnea</i> *	<i>Acrocephalus axillaris</i> Benth., <i>Pterocarpus macrocarpus</i> Kurz, <i>Leucas cephalotes</i> (Roth) Spreng, <i>Catharathus roseus</i> (L.), <i>Duranta repens</i> L., <i>Tridax procumbens</i> L.	6

\*\* = 3 nectar food foraged by butterfly (Specialist) \* = Above 3 nectar food plants foraged by butterfly (Generalist)

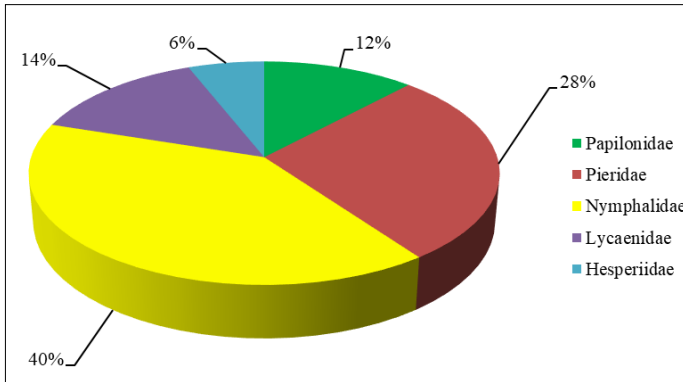


Fig 3.1: Percent composition butterfly species in different family

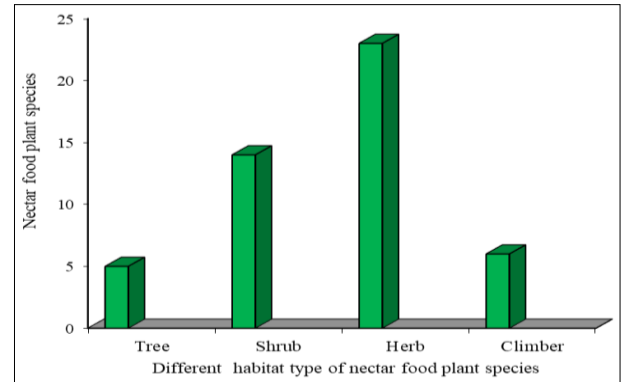


Fig 3.2: Showing habit type of nectar food plants species used by butterfly species

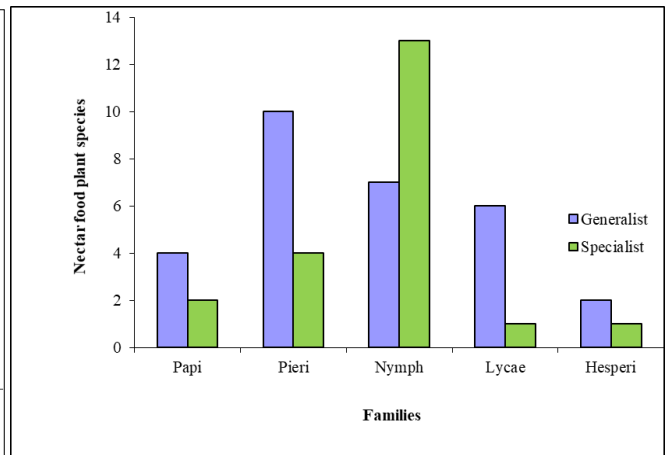
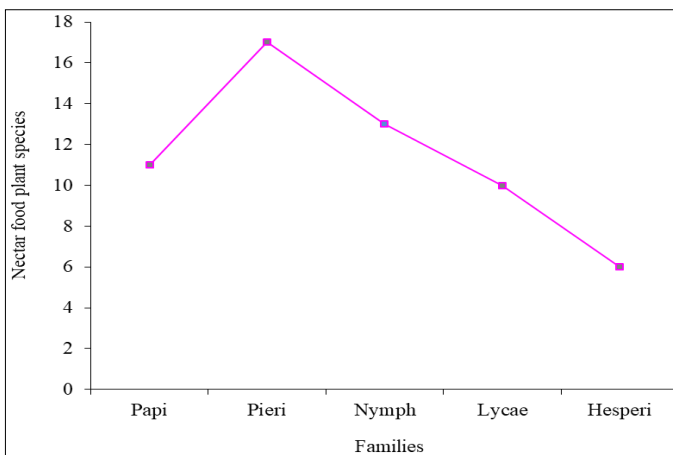


Fig 3.5: Showing nectar food plants used by the generalist and specialist of butterfly families

4. Discussion

During the study period, 48 nectar food plants belonging to 18 families used by 50 butterfly species were recorded in five study sites of Magway Township. These 50 butterfly species belong to the five families, Papilionidae, Pieridae, Nymphalidae, Lycaenidae and Hesperidae. In the study area, some butterfly species forage on a wide variety of nectar plants and some species show preference on the particular type of nectar food plants. In the present study, *Acrocephalus axillaris* Benth, *Catharathus roseus* (L.), *Ichnocarpus frutescens* (L.) R.Br, *Euphorbia hypericifolia* L., *Jatropha gossypifolia* L., *Clitoria ternatea* L., *Tridax procumbens* L., *Wedelia chinensis* (Osbeck) Merr., *Ixora coccinea* L., *Ruellia tuberosa* and *Hibiscus rosa-sinensis* L. blossom throughout the year and majority of butterfly species forage on these.

In family Pieridae, *Ixias pyrene*, *Catopsilia pyranthe* and *C. Pomonacorned* almost any nectar food plants so they are more abundant than the other species. *Papilio demoleus* (Papilionidae), *Danaus chrysippus* and *Junonia lemonia* (Nymphalidae), *Zizeeria karsandra* (Lycaenidae) and *Caltoris brunnea* (Hesperidae) were fairly abundant in the present study. *Danaus genutia* was very abundant in Site III since this site was existed with abundant preferred nectar food plant of *Crotalaria retusa* for *D. genutia*.

Bhuyan *et al* [17] stated that the character of the flowers of *Crotalaria* might be adapted to provide ease in perching for collection of nectar by the butterfly. Similarly, Kunte [3] stated that *Danaus genutia*, *Tirumala limniace* and *Euploea core* were found to aggregate in large numbers on the foliage of *Crotalaria retusa*. Up to 20 butterflies were noted

to feed gregariously on a single plant. As the same way, a large numbers of *Danaus chrysippus*, *D. genutia* and *Tirumala limniace* were found to aggregate on a single plant of *Crotalaria retusa* during the present study.

Mathew [18] suggested that, the flower head of *Clerodendron paniculatum* were found to be very much preferred by butterflies belonging to Papilionidae and Pieridae. Similarly, butterfly under family Papilionidae and Pieridae more on *Clerodendron paniculatum* and *Acrocephalus axillaris* Benth, were preferred as their food in the present study.

Nimbalkar *et al.* [8] identified and described 19 nectar food plants species from Bhor Tahsil, India. In these species, 6 nectar food plants species are same with the present study. Ramana [19] reported (70) nectar food plants of butterfly in the Eastern Ghats, India 11 species are similar to the present study. Therefore, some plants of nectar source for adult butterflies are widely distributed in their habitat range and some are restricted to only particular area, habitat or environment.

Four categories of nectar food plant were recorded in the study area: trees, shrubs, herbs and climber with 5, 13, 24 and 6 in species number respectively. Nimbalkar *et al.* [8] reported that the herbs from Bhor Tahsil, India, namely *Tridax procumbens* L. was more used by butterflies, probably due to the fact that the flowering period of these herbs is throughout the year. In the present study, this species was also used by the large number of butterfly species under all five families. One of shrubs species *Acrocephalus axillaris* Benth, was more used by many butterfly species as their food source. However, tree was used less than shrubs and herbs by butterflies.

#### 4. Conclusion

In conclusion, the preferred nectar food plants of adult butterfly are mostly wild and natural plants. The wild plants are more abundant in the Site II so the butterfly species are also abundant in this site. Family Asteraceae is very common and preferred by most butterfly species. Moreover, the information given in this work are more important for butterfly diversity and nectar food plant diversity to improve the ecological utility of butterflies as indicator taxa and pollinating agents and defining conservation strategies in the study area.

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