

# HOST PLANT UTILIZATION BY BUTTERFLIES AT VISAKHAPATNAM

J. B. ATLURI\*, D. SANDHYA DEEPIKA, M. BHUPATHIRAYALU AND K. CHINNA RAO

Andhra University, Department of Botany, Visakhapatnam - 530 003, A. P., INDIA

E-mail: janaki\_aditya007@yahoo.co.in

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\*Corresponding  
author

## ABSTRACT

In the present study the butterfly fauna and their larval host plants at Andhra University campus, Visakhapatnam, Andhra Pradesh were described. At Andhra University campus 38 butterfly species distributed among 29 genera were observed belonging to 8 families *i.e.*, Danaidae-3; Satyridae-3; Nymphalidae-11; Lycaenidae-6; Papilionidae-7; Pieridae-6, Acraeidae -1 and Hesperidae -1. These butterflies utilized 74 plant species as their larval host plants. Among the 38 butterfly species *Euploea core core* could utilize 8 host plant species, *Neptis hylas* 7; *Junonia lemonias* and *Eurema hecabe simulata* 6 each; *Elymnias caudata*, *Acraea terpsicore*, *Junonia hierta* and *Priniceps demoleus* utilized 5 each. The remaining butterfly larvae utilized less than 5 host plant species except 2 species *Everes lacturnus syntala* and *Barbo cinnara* which could not be found to feed on any of the host plants available at the study site. Also the breeding behavior and season of each of the butterflies were described.

## INTRODUCTION

Plants and animals have frequently experienced local extinction due to extensive habitat distinction in urban areas (Wilcove *et al.*, 1998; Mc Kinney, 2002; Miller and Hobbs, 2002). Establishment of butterfly gardens, butterfly houses helps maximize butterfly diversity and abundance in Urban and suburban areas. Maintenance of stocks in such butterfly houses is essential for possible reintroduction through captive breeding in conservation programmes. The host finding and egg laying are the crucial events in the life of butterflies since the hatching larvae are often relatively immobile and depend on the choice of the food plant by the gravid female (Thompson and Pellmyr, 1991; Renwick and Chew, 1994). The management of larval food plants plays a crucial role in the success of captive breeding programmes. In India site specific records of larval host plants are very few. Larval host plants of the butterflies of North Western Karnataka, central Western Ghats and Nilgiri mountains were recorded by T.R. Bell, J. Davidson and E.H. Aitken. Recent records of larval host plants include those of Gay *et al.*, 1992, Haribal (1992), Gunathilagaraj *et al.*, 1998 and Kunte (2000 and 2004). The present study describes the butterfly fauna their breeding season and larval host plants at Andhra University campus, Visakhapatnam, Andhra Pradesh.

## MATERIALS AND METHODS

The Andhra University Campus is spread over 0.5km<sup>2</sup> and is in proximity to the coast line. The vacant land once existed in campus is getting depleted due to the construction activity to accommodate several new courses and also due to increased student strength. But still the campus supports beautiful large

patches of wilderness and is mainly of the deciduous secondary vegetation type with some ever green species. In the rainy season a luxuriant growth of a variety of herbs and shrubs gives somewhat compactness to the vegetation. The seasonal annuals that come up during the rainy season dry up with the onset of winter giving rather open view to the vegetation.

The butterflies normally appear in their largest numbers when there is plenty of green vegetation that serves as both foliar and floral hosts. Regular field trips were made at 10 day intervals to record their composition. Representative samples of butterflies were collected during field survey using the methods described by De Rhe - Philipe (1931). They were collected by stalking or by chasing the fast flying species or by gently sweeping low flying species. The collection was made before 1000h under conditions of warm weather. They were identified and released. Measurement of each butterfly species is taken from end to end of the wings at expanded position. After noting the wing size and other characters such as colour, markings on the wings of the butterflies they were compared and identified by referring to Talbot (1939, 1947), Wynter-Blyth (1957), D'Abbrera (1982, 1985, 1986), Larsen (1987, 1988), Gay *et al.* (1992), Gunathilagaraj *et al.* (1998) and Kunte (2000). The unidentified specimens were killed by pressing the thorax and preserved in the envelopes in a settling condition with fully opened wings. In order to prevent the spoilage of specimens Naphthalene was used. For nomenclature Varshney (1980, 1985), Gunathilagaraj *et al.* (1998) and Kunte (2000) were referred. As familiarity increased visual recognition of various species was possible. It has been verified for its validity from Zoological Survey of India, Kolkata. Taxonomic identification of the plants was done by the referring to the

flora of Visakhapatnam by Venkateswarlu *et al.* (1972) as well as comparison with the authenticated herbarium specimens available in the Botany department, Andhra University. The names adopted were the latest valid ones.

#### Composition of the butterfly species

At Andhra University campus 38 butterfly species representing 29 genera were observed. The number of species representing each of the eight families is Danaidae-3; Satyridae-3; Nymphalidae-11; Lycaenidae-6; Papilionidae-7; Pieridae-6 and Acraeidae and Hesperidae each 1.

#### Ovipositing activity and host plant preference of butterflies

When the female is ready to oviposit, and look for the host plant, show higher frequency of the wing strokes. While, identifying the right host plant they touch the leaves with their fore legs and then fly off from one plant to another until the right host plant comes across. When the suitable host plant is found, the female alights on the leaf, holds the leaf with the torcel claws then bends the tip of the abdomen until it reached the leaf and deposit the egg and fly off. Lycaenides walk over young branchlets of the host plant and oviposit at the axils of young leaves.

The period of egg laying, no. of eggs laied at each time and the larval host plants registered are described for each of the butterfly species in the following.

#### Larval host plants utilized at the study site

In the present study 74 plant species are utilized by larvae as their host plants.

Majority of the plant species are utilized by 1 or 2 butterfly species as their larval hosts. *Rostellularia procumbens* served as a larval host plant for all the 5 species of *Junonia i.e.*, *Junonia almana*, *J. hierta*, *J. iphita*, *J. lemonias* and *J. orithya* available at the study site, in addition *Phyla nodiflora*, *Barleria prionitis*, *Dipteracanthus aculata*, *Ruellia tuberosa* and *Evolvulus alsinoides* are also fed by only *Junonia* larvae. *Zizyphus mauritiana* is fed by *Castalius rosimon rosimon*, *Spindasis vulcanus vulcanus* and *Princeps demoleus* larvae. *Cassia siamea* is also fed by the larvae of three butterfly species *Catopsilia pomona*, *C. pyranthe* and *Eurema hecabe simulata*.

Among the 38 butterfly species *Euploea core core* could utilize 8 host plant species, *Neptis hylas* 7; *Junonia lemonias* and *Eurema hecabe simulata* 6 each; *Elymnias caudata*, *Acraea terpsicore*, *Junonia hierta* and *Princeps demoleus* utilized 5 each; *Spindasis vulcanus vulcanus*, *Zizeeria karsandra*, *Papilio polytes*, *Catopsilia pomona* and *C. Pyranthe* utilized each 4 species, *Hypolimnas misippus*, *Junonia iphita*, *J. orithya*, *Jamides celeno aelianus* and *Graphium agamemnon menides* could utilize each 3 species; *Danaus chrysippus chrysippus*, *Tirumala limniace leopardus*, *Melanitis leda ismene*, *Ariadne merione merione*, *Euthalia garuda*, *Hypolimnas bolina*, *Junonia almana*, *Castalius rosimon rosimon*, *Rathinda amor* each 2 species. *Phalanta phalantha phalantha*, *Graphium doson*, *Pachliopta hector*, *Anaphaeis aurota*, *Pareronia valeria anais*, *Papilio polymnestor*, *Mycalesis visala subdita*, *Pachliopta aristolochiae*, *Leptosia nina nina* each 1 species. The larvae of the remaining 2 species *Everes lacturnus syntala*, *Barbo cinnara*, could not be found to feed on any of the host plants available at the study site.

#### Breeding season and oviposition plants of the butterflies

1) *Danaus chrysippus chrysippus*: The butterfly was observed to breed throughout the year. Pairing occurred mostly during 0900-1700h and lasted for more than 3h. Eggs were laid singly on the upper and under surfaces of leaves of the growing branches. In a single egg - laying bout, 8 to 12 eggs were laid on different leaves. Larval host plants – *Calotropis gigantea*, *Pergularia daemia*.

2) *Tirumala limniace leopardus*: Mating was observed during the day between 0900 – 1700h, and the copulating pair stayed tied together for over two hours. The breeding female laid eggs in the morning from 0930 – 1130h. Eggs were laid singly on the upper and underside of young and soft leaves.

Larval host plants – *Calotropis gigantea*, *Tylophora indica*.

3) *Euploea core core*: The butterfly was observed to breed throughout the year. Pairing occurred mostly during day time. Pairing lasted for about three hours. The breeding female was found to lay eggs mostly in the morning hours between 0900 – 1130h. At a time, the female was found to lay 4 to 5 eggs, each egg being laid singly on different branches and also on flower buds.

Larval host plants – *Nerium indicum*, *Adenium odorum*, *Hemidesmus indicus*, *Tylophora indica*, *Ficus benghalensis*, *F. benjamina*, *F. religiosa*, *F. microcarpa (retusa)*.

4) *Elymnias caudata*: The butterfly was observed to breed during October-May. Mating and oviposition occurred between 1100 – 1500h. Mating lasted for about two hours. Eggs were laid singly on the lower surface of growing leaves, rarely on upper side. In a single egg-laying bout, 3 -7 eggs were laid on different leaves. Larval host plants - *Areca catechu*, *Bambusa arundinacea*, *Cocos nucifera*, *Musa paradisiaca* and *Phoenix* sps.

5) *Melanitis leda ismene*: The breeding female laid eggs singly on underside of leaf surface. Oviposition time could not be spotted due to crepuscular nature of the adult.

Larval host plants – *Bambusa arundinacea*, *Ficus religiosa*.

6) *Mycalesis visala subdita*: The breeding female laid eggs singly on underside of leaf surface mostly during 0930 - 1400h of day.

Larval host plants - Grasses.

7) *Ariadne merione merione*: The butterfly was found to breed all throughout the year. Copulating pairs were found during day time. The breeding female laid eggs in singles on the under surface of leaves mostly during 0900 - 1200h. At a time it laid about 6 - 15 eggs. There was no bias for the age of the leaf, on one occasion old leaf had 1 - 7 eggs laid, and a tender leaf 1 - 3 eggs.

Larval host plants - *Ricinus communis*, *Tragia involucrata*.

8) *Euthalia garuda*:

Larval host plants - *Mangifera indica* and *Ancardium occidentale*

9) *Hypolimnas bolina*: The female laid eggs singly or in small batches (2-6 eggs) on the under surface of the leaves. It laid about 5-12 eggs at a time but on different leaves, mostly

during 0930 - 1200h. Sometimes it also laid eggs on the dried sticks near its host plant.

Larval host plants - *Erythrina variegata*, *Sida cordata*.

10) *H. misippus*: Mating and oviposition took place during 0900 - 1400h. The female laid eggs singly on the under surface of the young leaves. About 6-12 eggs were laid at a time but on different leaves.

Larval host plants – *Asystasia gangetica*, *Sida cordifolia*, *Portulaca quadrifida*.

11) *Junonia almana*: Mating and oviposition took place during 0900 - 1400 h. The gravid female laid eggs singly on the underside of the young and mature leaves. About 8 - 12 eggs were laid at a time but on different leaves.

Larval host plants: *Phyla nodiflora*, *Rostellularia procumbens*.

12) *Junonia hierta*: Mating and oviposition took place during the forenoon and afternoon hours of the day mostly during 1000 - 1400h. The breeding female can lay 4 -7 eggs at a time but on different leaves. There was no bias for upper and lower surface of the leaf, but mostly upper surface was used. Sometimes the eggs were laid on the twigs, or on the walls or dried sticks near by its host plant.

Larval host plants – *Barleria prionitis*, *Dipterocanthus aculata*, *Rostellularia procumbens*, *Ruellia tuberosa*, *Phyla nodiflora*.

13) *Junonia lemonias*: Eggs are laid singly. Breeding female can lay 6-10 eggs at a time but on different leaves. Sometimes eggs are laid on the twigs also. Egg-laying usually takes place during fore-noon hours of the day.

Larval host plants - *Asystasia gangetica*, *Barleria prionitis*, *Dipterocanthus aculata*, *Rostellularia procumbens*, *Ruellia tuberosa*, *Phyla nodiflora*.

14) *Junonia orithya*: Oviposition takes place during 1000 - 1400 h. The gravid female laid eggs singly on the underside (near to edge) or upperside (near to petiole) on both fresh and mature leaves. About 6 - 10 eggs were laid at a time but on different leaves.

Larval host plants – *Evolvulus alsinoides*, *Rostellularia procumbens* and *Phyla nodiflora*.

15) *Junonia iphita*: Mating and oviposition took place during 0900-1300h. The gravid female laid eggs singly on the underside of the young and mature leaves. About 6-10 eggs were laid at a time but on different leaves. For egg laying this butterfly mainly prefers shaded places. It also lays eggs on the leaves of plants that are growing intermingled with its host plant (indirect egg laying).

Larval host plants – *Diptheracanthus aculata*, *Ruellia tuberosa*, *Rostellularia procumbens*.

16) *Neptis hylas*

Larval hosts: *Ceiba pentandra*, *Kanavalia gladiata*, *Pongamia pinnata*, *Thespesia populnea*, *Triumfetta pentandra*, *Helicteres isora*, *Grewia tiliifolia*

17) *Phalanta phalantha phalantha*: Oviposition takes place during 0900 – 1400h. The gravid female laid eggs singly on the upperside or underside edges of the fresh leaves, which are pinkish. Eggs were also being laid on twigs of these fresh leaves. About 6 – 8 eggs were laid at a time but

on different leaves.

Larval host plants – *Flacourtia indica*

18) *Acraea terpsicore*: Eggs are laid in clusters on the under surface of the leaves. Each cluster has 4-6 eggs and all the eggs are deposited at a time in sequence. The breeding female lays eggs in the forenoon hours of the day, mostly between 0600-1100h.

Larval host plants – *Mangifera indica*, *Musa paradisiaca*, *Hibiscus cannabinus*, *Passiflora foetida*, *Hybanthus ennaespermus*.

19) *Castalius rosimon rosimon*: It oviposited on young leaves during July-August. Eggs small and single.

Larval host plants – *Ziziphus mauritiana* and *Ziziphus oenoplia*.

20) *Jamides celeno aelianus*: It oviposited on young leaves during July-August. Eggs single.

Larval host plants – *Pongamia pinnata*, *Abrus precatorius* and *Cajanus cajan*.

21) *Spindasis vulcanus*:

Larval host plants: *Canthium parviflorum*, *Zizipus mauritiana*, *Psidium guajava*, *Allophylus cobbe*.

22) *Rathinda amor*: Oviposition takes place during 0900 – 1400 h. The gravid female laid eggs singly on the petioles (at axillary position) and also on the undersurface of young leaves exclusively. About 7 – 9 eggs were laid at a time but on different leaves.

Larval host plants – *Ixora arborea*, *I. coccinia*.

23) *Zizeeria karsandra*: Oviposition takes place during 1000 – 1300h. The gravid female laid eggs singly on the undersurface of the leaflets and occasionally on the midrib. There was no discrimination among young and mature leaves while laying eggs. About 6 - 8 eggs were laid at a time but on different leaflets or leaves.

Larval host plants - *Tribulus terrestris*, *Amaranthus viridis*, *Lantana camara*, *Zornia diphylla*.

24) *Graphium agamemnon menides*: It lays eggs singly on lower and upper surface of the young leaves. A breeding female lays 8-12 eggs in sequence but on different leaves of the host plant.

Larval host plants - *Annona reticulata*, *Annona squamosa*, *Polyalthia longifolia*.

25) *Graphium doson*: The butterfly largely breeds during May - September, and oviposition in a day takes place during 0600 - 1000h. Eggs are laid singly on both upper and lower sides of leaves.

Larval host plants - *Polyalthia longifolia*.

26) *Pachliopta aristolochiae aristolochiae*: The breeding females lay eggs singly on upper surface of leaves and petioles, more commonly between morning and pre-noon hours.

Larval host plants - *Aristolochia indica*.

27) *Pachliopta hector*: The butterfly lays eggs singly. The adults breed throughout the year and oviposit mostly during 0800-1200h. It lays 6-8 eggs in a sequence, preferably on different leaves.

Larval host plants - *Aristolochia indica*.

28) *Papilio polytes polytes*: Eggs are laid singly on the upper and lower surface of young leaves, sometimes eggs are also laid on twigs. The breeding female lays eggs mostly around noon - time and 8-12 eggs are laid singly in a single stretch of 30min. duration.

Larval host plants – *Annona squamosa*, *Aegle marmelos*, *Citrus aurantium*, *Murraya koenigii*.

29) *Princeps demoleus*: Eggs are laid singly on both surfaces of young leaves and sometimes also on twigs. The breeding female lays 8-10 eggs at a time and oviposition takes place during 0800 – 1200h of the day.

Larval host plants – *Aegle marmelos*, *Citrus aurantium*, *Murraya koenigii*, *Chloroxylon swietenia*, *Ziziphus mauritiana*

30) *Papilio polymnestor*:

Larval host plants: *Atalantia monophylla*.

31) *Anaphaeis aurota*: The butterfly breeds during December – April/May and ovipositing in the day takes place during 0900-1200h. Eggs are laid in clusters, the number of eggs in a cluster varying from 15-55. They are deposited close together but not in adherence. Both upper and lower surface of young leaves are used for egg laying.

Larval host plants - *Capparis zeylanica*.

32) *Catopsilia pomona*: Eggs are laid singly. It oviposited on fresh leaves during July-September.

Larval host plants - *Cassia siamea*, *C. fistula*, *C. occidentalis*, *Bauhinia racemosa*.

33) *Catopsilia pyranthe*: Egg laying activity takes place any time during the day light hours. Eggs are laid singly on young, soft and light green leaves at the terminal parts of growing stem exposed to sun light.

Larval host plants - *Bauhinia racemosa*, *Cassia occidentalis*, *C.fistula*, *C.siamea*.

34) *Eurema hecabe simulata*: Mating normally occurs during the morning hours of the day, each mating lasts for 1 to 3 minutes. Eggs are laid singly and over a period of a minute, 8-10 eggs are laid. Eggs are laid on both surfaces of young and soft leaves.

Larval host plants - *Caesalpinia coriaria*, *Cassia occidentalis*, *C. siamia*, *Mimosa pudica*, *Samanea saman*, *Peltophorum pterocarpum*.

35) *Leptosia nina nina*: Mating and oviposition took place during day time mostly between 1100 - 1430h. Pairing lasted for an hour. The eggs were laid singly on the under surface of leaf, mostly by the side of midrib.

Larval host plants - *Capparis zeylanica*

36) *Pareronia valeria anais*: Mating and egg laying occurred during day time mostly between 1030 - 1500h. Pairing lasted for one and a half hour. The breeding female laid eggs in small batches of 6-8 on the underside of both young and old leaves.

Larval host plants - *Capparis zeylanica*.

### Oviposition habits

The present study revealed that the females of butterfly species

at Visakhapatnam laid eggs on such plant species which serve as their larval hosts. During oviposition, the adults used to test the rightness of the environment for laying eggs by tapping the leaves with forelegs. A similar behaviour was also reported with *Papilio mechaon* (Wiklund, 1974) and *Heliconius* sp. (Benson et al., 1975). Ilse (1955) and Fox (1966) showed that this behaviour acts as a chemical test of the properties of the leaf with the help of foreleg chemoreceptors. Most butterfly species oviposited on young shoots, flower buds and terminal foliage. Such plant structures are rich in nitrogenous compounds, and served to meet the nitrogenous requirement of larvae because the adults contribute nothing in many cases (Cottrell, 1984) and the older leaves evidently being unpalatable or even toxic. Kitching (1981) recognized three categories of butterflies on the basis of their egg-laying habit while most authors considered only two categories: (1) the cluster or batch layers and (2) those laying eggs singly. Analysis of the egg laying habits displayed by different butterflies encountered at Visakhapatnam indicated the predominance of single egg laying habit than the cluster or batch laying habit. Thus *Pareronia valeria anais* showed batch laying habit and *Acraea terpsicore* and *Anaphaeis aurota* showed cluster egg laying habit. These two categories of egg laying habits were also observed by butterflies in different geographical regions with the predominance of single egg laying habit than the cluster or batch laying habit (Chew and Robbins, 1984; Thompson and Pellmyr, 1991). In other parts of India also there is predominance of single egg laying habit (Kunte, 2000) and 66 of the 67 Papilionid butterfly species lay their eggs singly (Stamp, 1980). The host choices exhibited by the butterfly species under study may be or may not be repeated in other regions, and so specific associations are to be usually treated as a local phenomenon as expressed by Thompson (1988). Oviposition host plant preference may depend on the nectar source distribution. Adult activity and oviposition are both biased towards the area of adult nectar resource presence in *Euphydryas chalcedona* (Murphy et al., 1984) and in *Papilio glaucus* (Grossmueller and Lederhouse, 1987). The distribution of *Heodes virgaureae* in southern Sweden is largely dependant on the chief nectar source Tubiliflorae flowers (Douwes, 1975).

According to available literature on the larval hosts on Indian butterflies Fabaceae predominantly supported more number of butterfly species followed by Anacardiaceae, Combretaceae, Poaceae, Rhamnaceae, Sapindaceae, Verbenaceae, Loranthaceae, Rutaceae, Dipterocarpaceae, Euphorbiaceae, Malvaceae, Melastomataceae, Myrtaceae, Rubiaceae, Ulmaceae, and Urticaceae. Of the 86 families reported in the available literature the remaining plant families supported less than 40 butterfly species larvae. The families that supported a single butterfly species larvae include Caprifoliaceae, Chenopodiaceae, Crasullaceae, Ericaceae, Clusiaceae, Iridaceae, Marantaceae, Menispermaceae, Piperaceae, Scitaminaceae, Tamaricaceae and Thymeliaceae.

The present study revealed that the larvae prefer to feed mostly young leaves. Of the 38 butterfly species recorded the larvae of seven butterfly species are supported by Fabaceae followed by Acanthaceae (6) and Verbenaceae (5). Annonaceae, Asclepiadaceae, Capparidaceae, Malvaceae, Rhamnaceae and Rutaceae supported the larvae of three butterfly species each.

The family Poaceae which supported the larvae of major butterfly species in Africa and Australia (Ackery, 1991) supported only two butterfly species at Visakhapatnam. Among the 28 plant families utilized at Andhra University the Fabaceae members are fed by the larvae of *Hypolimnas bolina*, *Neptis hylas*, *Jamides celno*, *Zizeeria karsandra*, *Catopsilia pomona*, *C. pyranthe*, and *Eurema hecabe*. The Acanthaceae members supported the larvae of *Hypolimnas misippus*, *Junonia almana*, *J. hierta*, *J. iphita*, *J. lemonias*, and *J. orithya*. The Verbenaceae members supported *Junonia hierta*, *J. orithya*, *J. almana*, *J. lemonias*, and *Zizeeria karsandra*, and the remaining families supported the larvae of either one or two butterfly species. Some of the larval host plants utilized in the present study by some butterfly species are not recorded elsewhere in India. Such plant species include *Ficus benjamina* and *F. microcarpa* for *Euploea core*, *Pergularia daemia* for *Danaus chrysippus*, *Dipteracanthus aculata* for *Junonia hierta*, *Dipteracanthus aculata* and *Ruellia tuberosa* for *Junonia iphita* and *J. lemonias*, *Evolvulus alsinoides* for *J. orithya*, *Triumfetta pentandra* for *Neptis hylas*, *Ziziphus oenoplia* for *Castalius rosimon*, *Ixora arborea* for *Rathinda amor*, *Citrus aurantium* for *Papilio polytes* and *Princeps demoleus* and *Cassia occidentalis* for *Catopsilia Pomona* in addition to the already recorded larval host plants. Ovipositing insects experience external stimuli such as visual and olfactory cues, their own internal physiological stimuli and a series of environmental constraints such as availability of host plants (Visser, 1986; Bernays and Chapman, 1994; Badenes *et al.*, 2004). Colour vision is an important component in the recognition and use of floral food sources (Silberglied, 1984; Crane, 1955). Most studies on the host finding and the acceptance sequence have focused on visual factors such as shape, size and colour (Rausher, 1978; Stanton, 1983; Singer, 1993). Butterflies can also learn to associate a colour or a leaf shape (Rausher, 1978; Traynier, 1984, 1986; Papaj and Rausher, 1987) and recognize appropriate larval host plants in the field (Stanton, 1984). The oviposition choice of an insect is based on a complex set of stimuli and responses. Finch and Collie (2000) based on detailed observations of insect behaviour found that complete system of host plant selection involves a three-link chain of events in which the first link is governed by cues from volatile plant chemicals, the central link by visual stimuli and the final link by cues from non volatile plant chemicals. The findings of Talsma *et al.* (2008) showed that in the field the size of the plant appeared to be a more important stimulus with bigger plants receiving more oviposition than smaller plants regardless of their secondary chemistry. Our present study also revealed that among the larval host plants about 50% are the tree species utilized by the butterflies. Of the seven species of Papilionidae five species *Graphium agamemnon*, *G. doson*, *Papilio polymnestor*, *P. polytes* and *Princeps demoleus* fed on only tree species. The members of Lycaenidae and Pieridae also fed on tree species but along with the other habit types. In Australia the three families Lauraceae, Myrtaceae, and Cyperaceae are relatively widely exploited while in Afrotropics these families support few butterfly species. Our observations at Visakhapatnam are also similar to those in Afrotropics where Lauraceae and Cyperaceae are not at all utilized and Myrtaceae is utilized by a single butterfly species *Spindasis vulcanus*. One species of

*Acraea* that occurs in Australia favoured hosts belonging to Urticaceae, Passifloraceae, Tiliaceae, Flacourtiaceae and Violaceae (Ackery 1987), while the only species *Acraea terpsicore* at Visakhapatnam utilized the members of Anacardiaceae, Malvaceae, Musaceae, Passifloraceae, and Violaceae.

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