KFRI Research Report 146

MASS REARING OF SELECTED BUTTERFLIES FOR POSSIBLE REINTRODUCTION IN CONSERVATION PROGRAMMES

George Mathew

KERALA FOREST RESEARCH INSTITUTE
PEECHI, THRISSUR

April 1998 Pages: 44

CONTENTS

ABSTRACT

Captive breeding of organisms for possible reintroduction in species conservation programmes is well recognized. Insect breeding Centers, particularly butterfly farms, are the major attraction in many countries. However; in India not much progress has been made on these lines. In the present study, an attempt was made to standardise a methodology for captive breeding of butterflies under Kerala conditions.

General information on the butterflies found in a gwen locality. their habitat preferences as well as factors affecting survival is very essential for the success of any captive breeding programme. Build up of infra-structure and standardisation of a breeding programme for the species selected are also very important.

In this study, a general suruey was made on species found in KFRI campus at different seasons and their number monitored. Based on data gathered, the commom rose ***(Pachliopta aristolochiae)*** *and the southern birdwing* ***(Troides minos)*** *which breed on* ***Aristolochia indica*** *were selected for mass rearing. Attempts to maintain their population throughout the year in the insecto was not successful mainly due to defects of the insecto and therefore attempts were made to lure butterflies into the garden by planting appropriate larval and adult host plants and by offering suitable ecological conditions through landscaping. General facilities required for a 'butterfly house' are also briefly discussed.*

Key words: Butterfly house, butterfly garden, conservation, Kerala. India.

INTRODUCTION

Domestication of both plant and animal species has been practised in many fields of human endeavor such as commerce, research and teaching. The range of domesticated species has increased considerably with the advancement of scientific knowledge . The classical examples of successful domestication are those of the silk worm *Bombyx mori*, the honey bee *Apis mellifera* and the medicinal leech *Hirudo medicinalis* (Wilson. 1971). Other species such as the fruit fly *Drosophila melanogaster*, locusts and the giant snail *Achatina* sp., have been bred for educational or research purposes.

Current estimates indicate that only 1.6 million out of an estimated total of 30 million species have been so far collected and identified. Of these, the invertebrates form an overwhelming majority of life on earth, in terms of individuals, species and biomass. Not only are invertebrates dominantly diverse but they are also the basis of most ecosystem processes. It has been stated that if the vertebrates were to be wiped out, the World's ecosystems would be perturbed for several years but if invertebrates were to be wiped out our planet would never recover (Wilson, 1987).

Among invertebrates, insects form the major group. According to an estimate 7,51,000 species of insects have been so far recored (WRI. *et al*, 1992). Insects are of diversified habits and may be phytophagous, predatory, parasitic or saprophytic. However, majority of insects are phytophagous feeding either on the foliage, stem or fruits. It has been stated that approximately one quarter of insects are plant feeding species (Strong *et a1* 1984). Roughly half of these belong to the group Lepidoptera which include the butterflies and the moths.

SIGNIFICANCE OF LEPIDOPTERA

Lepidopterous insects being highly colorful have great aesthetic value. Many species of butterflies are much sought after because of their marvellous appearance. They have also been looked upon as organisms of ecological significance since they form the primary herbivores in the ecosystem. All stages of Lepidoptera are also fed upon by various higher groups of animals like birds, bats and mammals and thus form more than one link in the food web. Butterflies and moths being important pollinators of several wild and domesticated plant species, depletion of their population could adversely affect the regeneration of plants they pollinate. As the immature stages of

Lepidoptera are phytophagous in habits they also have great economic importance as pests of various crops of agricultural and forestry importance.

THREATS FOR SURVIVAL OF BUTTERFLIES

Ecological factors

Since butterflies are often dependent on specific host plants and have a complex life cycle, they are vulnerable to the activities of man which disturb their habitat. Land, drainage, application of fertilizers and herbicides, and mechanization have helped farmers to achieve high productivity, but these activities have affected the survival of several butterflies and their biotopes (van der Made, 1987). The Homerus Swallowtail *Papilio homerus* Fb. which once inhabited the 13 parishes in the island of Jamaica is currently found only in two isolated and diminishing strongholds. The principal reason for the depletion of this butterfly is due to destruction of the virgin wet rainforest habitat (Emmel and Garraway, 1990). Thus the main causes of the decline of butterflies include biotope destruction due to changed land management and the failure by several species to track the patches of their habitat that are still being generated in modern fragmented landscapes.

Local extinctions of butterfly populations during periods of unfavourable weather have also been reported. During such periods the habitat suitability also declines affecting survival of butterfly populations (Pollard, 1979; Thomas, 1980). For instance, the extinction of the black hairstreak *Strymonidia pruni* is reported to be caused by destruction of its breeding sites. There are about 12,000 species of butterflies found all over the world and if we assume that one in ten could be catergorized as threatened, then we are obliged to suspect that more than 1,200 species of buterflies could be facing extinction. It has been estimated that extinction of a single species may set in motion a chain of events, adversely affecting the survival of 10-20 other species which are related to it.

Butterfly trade

Butterflies have been objects for trade and it has been pointed out that collecting on a commercial scale can cause extinction of species (Sheldon. 1925; Mc Leod, 1979). Ford (1945) has stated that the extinction of *Lycaena dispar* in Britain was due to over collecting. Some are of the opinion that collecting can affect only populations that are already weakened ner, 1974: Spooner, 1963). Since all collections are aimed at the rare and colourful species, these are the species facing maximum threat.

PROTECTION OF BUTTERFLIES

Through legislation

In order to prevent over exploitation of various species, many countries have formulated strict measures of protection of fauna through legislation. Under the Indian Wildlife Act (GOI. 1982), 129 species have been includes schedule I and 292 species under schedule II. The act prohibits export of butterflies (dead or alive) and manufacture of decoration articles using these insects. According to section 40(2) of this act no person can acquire, receive, keep in custody or possession any of the species included in the above schedule with out prior permission of the Chief Wildlife Warden. Although attempts'are being made to prevent illicit collection of butterflies through legislation, many cases go unnoticed.

Through habitat improvement and reintroduction

As has been stated earlier, habitat loss is another reason for the dwindling butterfly population. Creation of lost habitats for augmenting natural populations and reintroduction of species has been suggested for conservation of butterflies. However, this method has rarely been explored as a means to re-establish wild poulations on account of the prohibitive costs (Hughes and Bennet, 1991).

Successful reintroduction programme requires establishment of appropriate technology and also formulation of a long term conservation programme for rare and endagered species. This is possible only through the establishment of specific Centers of Research and Development. At present, insect farming has been practised successfully for a few species like honey bees and silk moths and there are several research Institutions in India to cater to the R & D requirements of farming these insects. Butterfly farming Centers are not yet established in India, although in several countries like Malaysia, Taiwan, Papua New Guinea, Philippines and Sri Lanka such Centers are playing a major role in the conservation of local fauna. Such Centers may also be useful to impart environmental education to children and public (Khoshoo,

Although 269 international programmes are currently involved with species conservation, only one is concerned with invertebrates (Hughes and Bennett, 1991). It has been estimated that 2250 invertebrates (compared with 689 mammals, 1047 birds, 191 reptiles and 63 amphibians) are in danger of extinction (IUCN, 1990). With a view to promote conservation of invertebrates

IUCN has formed various 'specialists groups' which undertake captive breeding programmes. In India, very few attempts have been made in this direction except for the recent initative by the Zoo Outreach Organization in Coimbatore.

SCOPE OF BUTTERFLY CONSERVATION IN INDIA

India, with its diversifled habitats is very rich in its butterfly fauna with over 1430 species of butterflies reported from all over the country. But the advancements in human civilization has affected the natural habitats of many species of butterflies threatening their survival. As a result, the range of many species are very much restricted. According to Talbot (1939, 1947) and Wynter - Blyth (1957), as much as 520 species (including subspecies and races) constituting over 30% of known butterflies are rare. Even in the natural habitats, many species having highly specific ecological requirements are facing threats due to slow changes in the ecosystem as revealed by a study in the Silent Valley National Park where of the 100 species observed, about 13 were extremely rare (Mathew, 1990).

REVIEW OF LITERATURE

BUTTERFLY FAUNA OF INDIA

The Order Lepidoptera which is the second largest insect Order is estimated to contain over 1.40,000 species of which 12,000 are butterflies. Out of these, about 1430 species of butterflies under 10 families have been recorded from the Indian sub region (Talbot. 1939, 1947, D'Abrera, 1982, '85, '86). In Kerala, about 320 species of butterflies have so far been reported. Due to destruction of natural habitats, a number of these butterflies are to be found only in the forests. A recent study in Nilgiri Biosphere Reserve has indicated survival of several endangered and rare species of butterflies in this region (ZSI, 1988; Larsen, 1987, 1988; Mathew, 1990). With the current rate of disturbance to natural ecosystems, many species are likely to be phased out by the turn of the century unless urgent and active remedial action is initiated. Brief account of the various families well represented in Kerala are given below:

Papilionidae

They are popularly known as 'swallow tails' on account of the tail-like extension of their hind wings. In size, they range from small to very large and are beautifully colored. Of about 217 species (including sub species), 18 species are commonly found in Kerala. The larvae of some papilionids are known to develop on plants belonging to Aristolochiaceae *(Aristolochia indica, Bragantia* sp.): *Anonaceae (Anona* sp., *Polyalthia* sp.); Lauraceae *(Machilus macarantha, Listea floribunda, Cinnamomum zeylanicum, Actinodaphne* sp.) and *Rutaceae (Citrus* sp., *Aegle marmelos. Atlantia* sp., *Glycosmis pentaphylla* and *Xanthoxylum rhetsa).*

The southern bird wing *(Troides minos),* the malabar rose *(Pachliopta jophon),* the common rose *(P. aristolochiae).* the common mime *(Chilasa clytia),* the blue mormon *(Papilio polymnestor)* are some common papilionid butterflies found in Kerala.

Pieridae

Commonly known as whites or yellows, most of them are fond of sunshine and are found to frequent banks of streams or puddlles in aggregations. Of the 100 species reported from India, 35 species are found in Kerala.

The larvae develop on plants belonging to the families, Berberidaceae *(Berberis* sp.). Capparidaceae *(Capparis* sp.. *Crataeva* sp, *Cadaba* sp. and *Maerua* sp.); *Cruciferae (Cabbage);Euphorbiaceae (Hemicyclia* sp.*) Leguminosae (Cassia* sp., *Albizia* sp., *Wagatea* sp.. *Poinciana* sp.. *Butea* sp.); Loranthaeceae (Loranthus)as well as Salvadoraceae *(Salvadora* sp.).

The common jezbel *(Delias eucharis),* the common wanderer *(Pareronia valeria),* the lemon emigrant *(Catopsilia pyranthe)* and the common emigrant *(Catopsilia pomona).* the mottled emigrant *(Catopsilia* pyranthe) and the common grass yellow *(Eurema hecabe)* are the common pierids found in Kerala.

Danaidae

These are relatively hard butterflies that are unpalatable to predators on account of their feeding on plants containing alkaloids. The caterpillars develop mostly on plants belonging to Apocyanaceae *(Agonosma* sp., *Vallaris* sp.. *Ichocarpis* sp., *Marsdenia* sp. and *Raphistemma* sp.): *Rubiaceae (Alleophania* sp.); *Asclepiadaceae. Caesalpiniaceae* and *Utricaceae (Ficus* spp.*).*

There are 77 species occurring in the Indian subcontinent of which 14 species are found in Kerala. The Malabar tree nymph *(Idea malabarica),* the nilgiri tiger *(Parantica nilgiriensis),* the blue tiger *(P. limniace).* the glassy blue tiger *(P. aglea),*the striped tiger *(Danus genuita),* the plain tiger *(D. chrysippus)* and the common crow *(Euploeacore)* are certain species found in Kerala.

Satyridae

These butterflies are predominantly shade loving species and are found mostly in dense forests or such situations. They are mostly brownish in color and occur in large numbers frequenting over-ripe fruits or sappy exudation of plants. Some species exhibit seasonal variations as dry and wet season forms. Of about 330 species reported from the Indian subcontinent, 30 are found in Kerala which include the common bush brown *(Mycalesis perseus),* the white bar bush brown *(M. anaxias),* the common tree brown *(Lethe rohria)* and the common five ring *(Ypthima baldus).* Larvae develop on palms, grasses and bamboos.

Amathusidae

Members of this family, generally known as jungle queen, palm kings, duffers etc., are large sized and sombre colored. The morpho butterflies of South

America are well known for their brilliant iridescent colors. They rarely venture out in bright sunlight and are often confined to thick forests. Adults feed on over-ripe fruits and sappy exudation of trees. Their immature forms feed on leaves of bamboos or palms.

The species found in the lndo-Malayan region are very colorful and there are about 50 species in the Indian sub region of which at least two species belonging to Discophora are common in Kerala.

Nymphalidae

These butterflies are noted for their beautiful coloration, wing pattern and flight. They are popularly known as raja, nawab. baron, duke, duchess, commodore, sergeant, sailor, map, oakleaf, pansy, leopard, lacewing etc.

Nymphalid butterflies vary considerably in color being bright to brilliant. In size they range from 25-130 mm. Sexual dimorphism is present in some species while in others seasonal forms are present. A few species are known as mimics of danaids and there by gain protection. There are over 400 species of nymphalids in the Indian sub region, of which 48 species occur in Kerala. The common bush brown *(Moduza procris)*, the common sailor (*Neptis hylas*), the great egg fly (*Hypolimnas bolina*), the yellow pansy (*Junonia hierta*). the lemon pansy (*J. lemonias*), the baron *(Euthalia garuda)* and the tamil yeoman (*Cirrochroa thais*) are some of the species commonly found in Kerala.

The immature stages feed on *Tamarindus indica, Caesalpinia* sp.. *Adenanthera pavonina, Albizia* spp., *Mangifera indica, Anacardium occidentale, Haldina cordifolia, Xylia xylocarpa, Olea dioica* etc.

Lycaenidae

They are predominantly blue in colour and are generally small in size. The immature stages mostly feed on Acanthaceae *(Strobilanthus* sp.). Amaranthaceae (Amaranthus sp.), Cycadaceae *(Cycas* sp.). Leguminosae (*Abrus* sp., *Albizia* sp., Cassia sp., *Xylia* sp.). Utricaceae *(Ficus* sp.) and Verbanaceae *(Clerodendron* sp. and *Lantana* sp.). There are about 650 species in India, of which 35 are known from Kerala which include the gram blue (*Euchrysops cnejus)*, the common cerulean *(Jamides celeno)*, the metallic cerulean *(J. alecto)* and the common pierrot *(Castalius rosimon).*

BUTTERFLY FARMING

Butterfly farming is closely linked with establishment of 'butterfly houses'. Perhaps the roots of this technique are in Britain where the 'butterfly house' exhibit has grown from two different lepidopteral industries: first from breeders of European butterflies who began breeding exotic tropical species and secondly from the silk industry where some breeders began displaying certain exotic silk moths to visitors.

From the merger of these two activities and the provision of large glass enclosures, there developed the 'butterfly house' - which emerged as a public attraction in the 1960s. The first butterfly farm- the Guernsey Butterfly Farm was established in the U.K. in the 1960s. The 1980's saw a massive expansion of the business with over 40 facilities being reported by 1986 . A survey conducted in 1987 in 26 butterfly houses in UK has indicated that 306 species of butterflies were used in the butterfly houses with 26-75 species being kept at any one time (Collins, 1987).

The concept of captive breeding is also relevant in species conservation programmes. On occasions when a species is threatened with extinction due to destruction of its habitat and absence of other suitable sites to which it could be transferred , there is a need to maintain stocks in captivity for use in future reintroductions (Morton, 1983). At Wood Walton Fen in Britain, for example, a free living population of the Dutch race of the large copper butterfly *Lycaena dispar batavus* is supplemented annually by specimens reared in captivity (Nature Conservancy Council, 1977). The concern for the conservation of butterflies has led to the formation of the IUCN specialist group on butterflies.

Thus, butterfly farming is a novel technique which simultaneously meets commercial demands for specimens with out affecting wild populations, puts cash into the local economy and (probably most important) fosters local interest and commitment to the conservation ethic. As a commercial enterprise and as a conservation oriented programme, butterfly farming is highly promising. Butterfly farming is beneficial in conservation of tropical forests and also provides rural economics with income (Pearson. 1992).

MATERIALS AND METHODS

An existing insectory (8m x 5m x 5m) covered with fine steel netting and provided with a double door was made use of for rearing purpose (Figs. 1a and 1b). Within the cage appropriate larval host plants were maintained to facilitate oviposition by the butterflies released. In addition to this, provision was also made to keep diluted sugar solution for sustaining butterflies.

An area of approximately 0.5 ha surrounding the insectory was landscaped so as to produce different habitats such as dense vegetation (Figs. 2a & 2b), open areas, bushes etc., in order to attract local butterflies having different habitat preferences. The species planted in this area include *Aristolochia indica, Murraya koenigi Crotalaria retusa Lantana camara, Clerodendron capitatum Cassia* sp.. as well as *Citrus* sp., which serve as host plants of several butterflies like *Pachliopta aristolochiae, Papilio demoleus, Danaus genuita and Tirumala limniace leopardus* (Appendix-I). Regular observations were also made on butterflies visiting various plants.

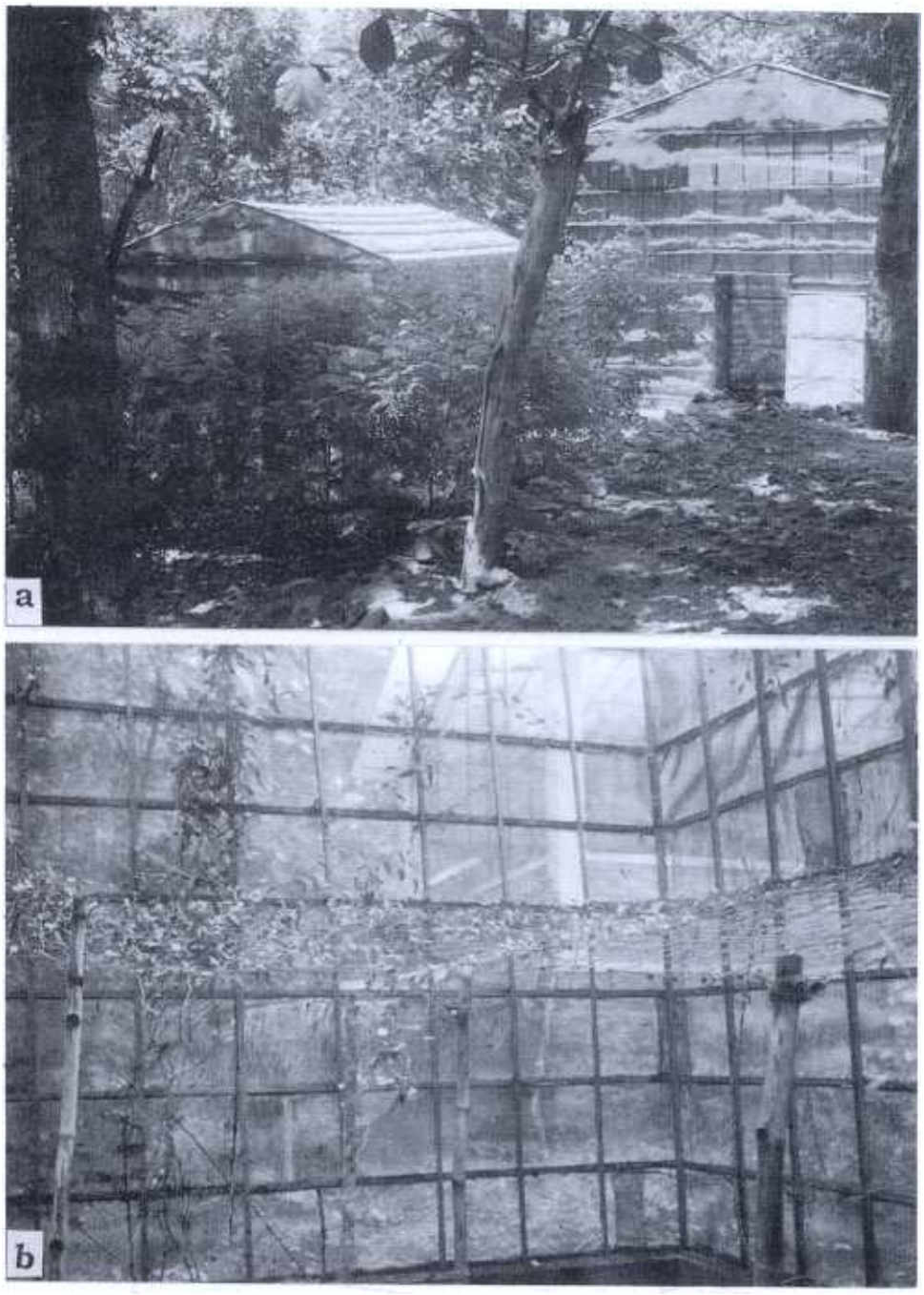

Fig. 1. a. View of the butterfly house in KFRI campus

b. Interior of the butterfly house with *Aristolochia indica* grown for breeding the common rose, *Pachliopta aristolochiae*

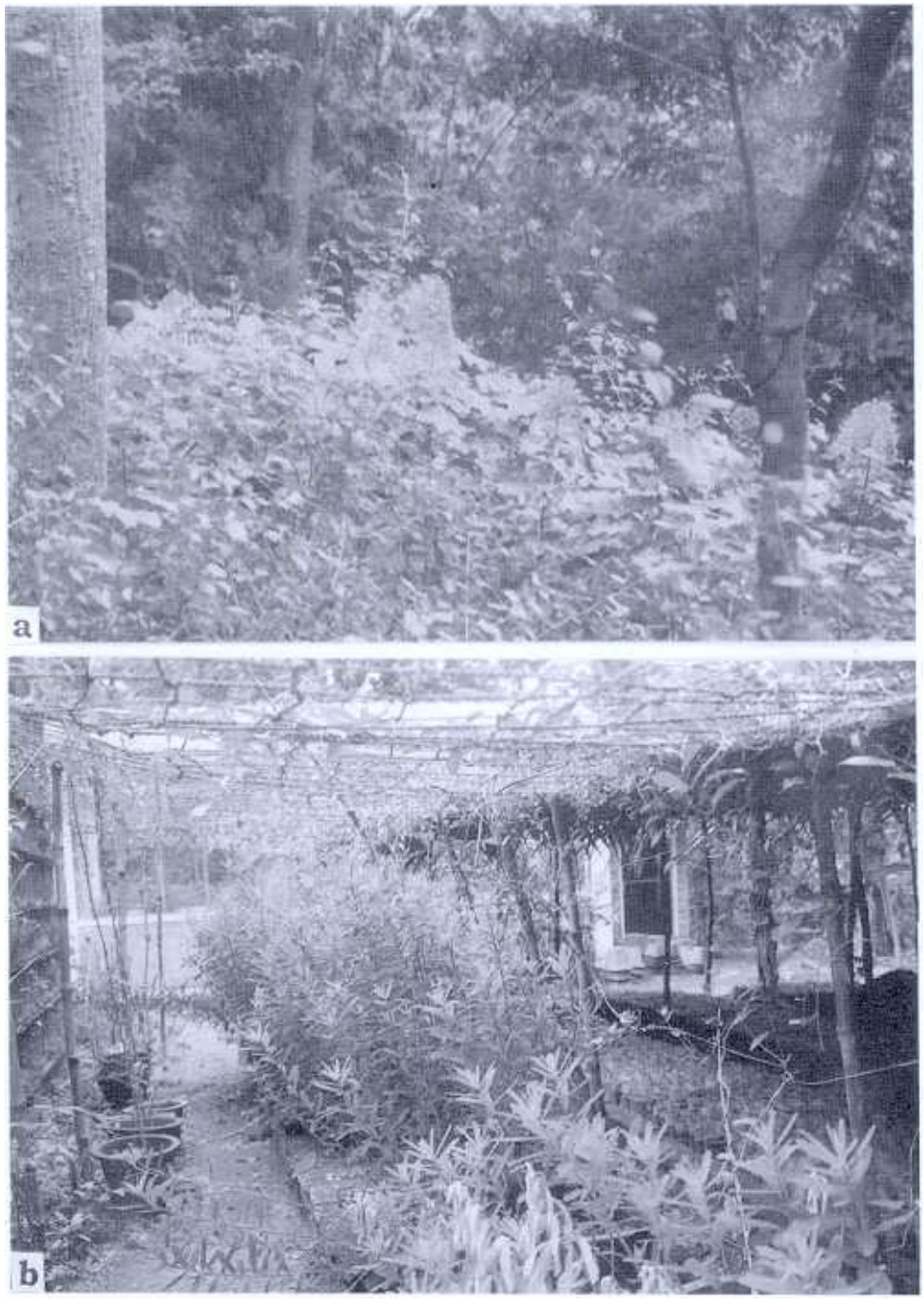

Fig. 2. a. View of the butterfly garden in KFRI campus containing flowering plants like *Lantana camara* and *Clerodendron paniculatum*

b. Crotalaria grown into hedges for attracting danaine butterflies

RESULTS AND DISCUSSION

It took nearly two years for establishing the plants in the insectory and in the surrounding area. With the establishment of plants, various butterflies started to frequently visit the area leading to the formation of a small local population.

BUTTERFLIES OBSERVED IN THE BUTTERFLY GARDEN

A list of butterflies, with details of their number and occurrence pattern are given in Table 1. Altogether, 11 species of butterflies belonging to the families

Table 1. List of butterflies recorded from the butterfly garden established at Peechi

Family/species	Plant host	Remarks
Papilionidae		
Papilio paris Moore	*Clerodendron paniculatum, Lantana camara*	1 or 2 individuals visiting flowerheads in the morning and afternoon
P. polymnestor parinda Moore	"	"
P. polytes Cramer	"	"
P. demoleus Lin.	"	"
Troides minos Cramer		"
Tros hector Lin.		Several individuals feeding at flowers
Pachliopta aristolochiae Fb.		
Danaidae		
Danaus genuita genuita Cramer	*Crotalaria retusa*	20 to 30 butterflies aggregating on foliage
Tirurnala limniace leopardus Butler		
Euploea core core Cramer		
Pieridae		
Eurerna blanda Boisd.		A few butterflies (2-3 nos.) frequenting flower heads of L. *camara* and *Cassia* sp.

Papilionidae, Danaidae and Pieridae were observed in the study area. The flower heads of *Clerodendron paniculatum* and *Lantana camara* were found to be very much preferred by butterflies belonging to Papilionidae and Pieridae. The danaids *Danaus genuita, Tirumala limniace* and *Euploea core* were found to aggregate in large numbers on the foliage of *Crotalaria retusa*. These butterflies were observed to lacerate the leaf surface by scratching with the front tarsal claws and then lick the exuding sap. The lacerated leaves later withered. Up to 20 butterflies were noted to feed gregariously on a single plant and heavy incidence of butterflies led to the wilting of plants. Danaid butterflies are already reported to feed on plants containing alkaloids. Caterpillars of an arctiid *Argyria* sp. were found to develop on foliage of *C. retusa* occasionally causing die-back of crotalaria seedlings (Figs. 3a & 3b).

An evaluation of the establishment of various butterflies in the study area was also made by examining the larval host plants for the presence of their immature stages. The hedges of *Aristolochia indica* contained eggs, larvae and pupae of the common rose *Pachliopta-aristolochiae* (Fig. 4a) and of the southern bird-wing *Troides minos* (Fig. 4b). Similarly, the immature stages of the lime butterfly *Papilio demoleus* (Fig. 5a) was noted on *Citrus* sp., and *Murraya koenigi; Moduza procris* on *Mussaenda frondosa* and *Euploea core* on *Ficus glomerata*. Observations were also made on the occurrence of butterflies in the garden during the various months (Table 2). Data gathered has shown that, in general, the number of butterflies present was high during the months September to December. The butterflies showed a reduction in population during in summer (March-May).

Seven species of papilionids including *Papilio* paris, P. *polymnestor;* (Fig. 5b) P. *dernoleus;* the danaids *Pachliopta aristolochiae, Parantica nilgiriensis* and *Euploeacore* were observed quite frequently in the garden. The pierids *Eurema hecabe* and *Catopsilia pornona* (Fig. 6a and 6b) were also found in small numbers feeding at the flowers of *Lantana camara* and *Cassia* sp.

BUTTERFLIES RELEASED IN THE FIELD CAGE

Preliminary attempts to farm butterflies in captivity were made by releasing both the adult and immature stages of certain commonly available butterflies like *Troides minos, Papilio demoleus* and *Pachliopta aristlochiae* in the insectory, where appropriate larval host plants of each of these butterflies *(Citrus* sp.. *Aristolochia indica etc.)* have been established. Water as well as diluted sugar solution were kept in separate containers for feeding the butterflies.

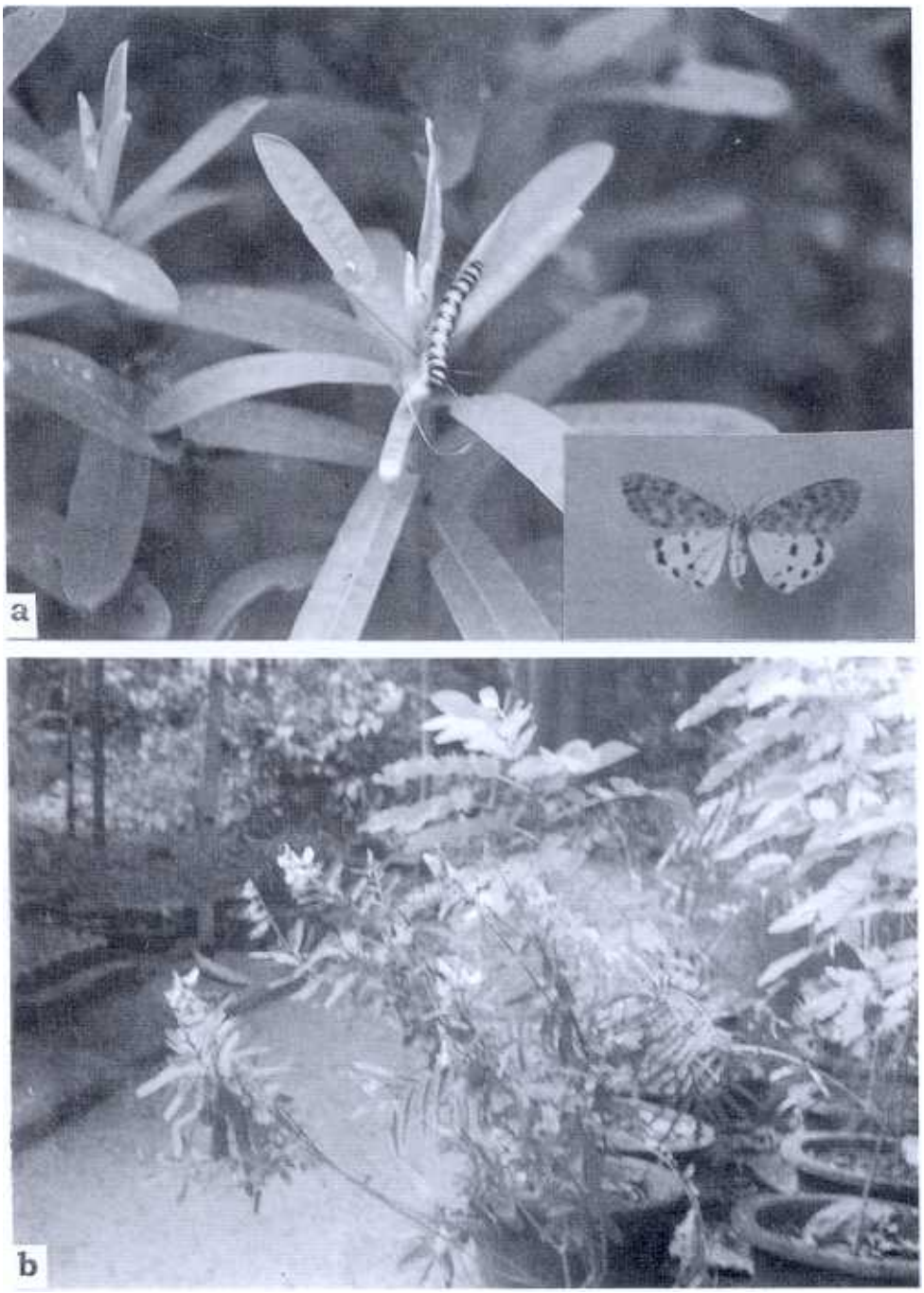

Fig. 3. a. Close-up of *Crotalaria retusa* showing a caterpillar of *Argyria* sp. (Arctiidae).Inset: The moth

b. *Crotalaria retusa* in bloom. Both leaves and flowers attract and sustain various danaine butterflies

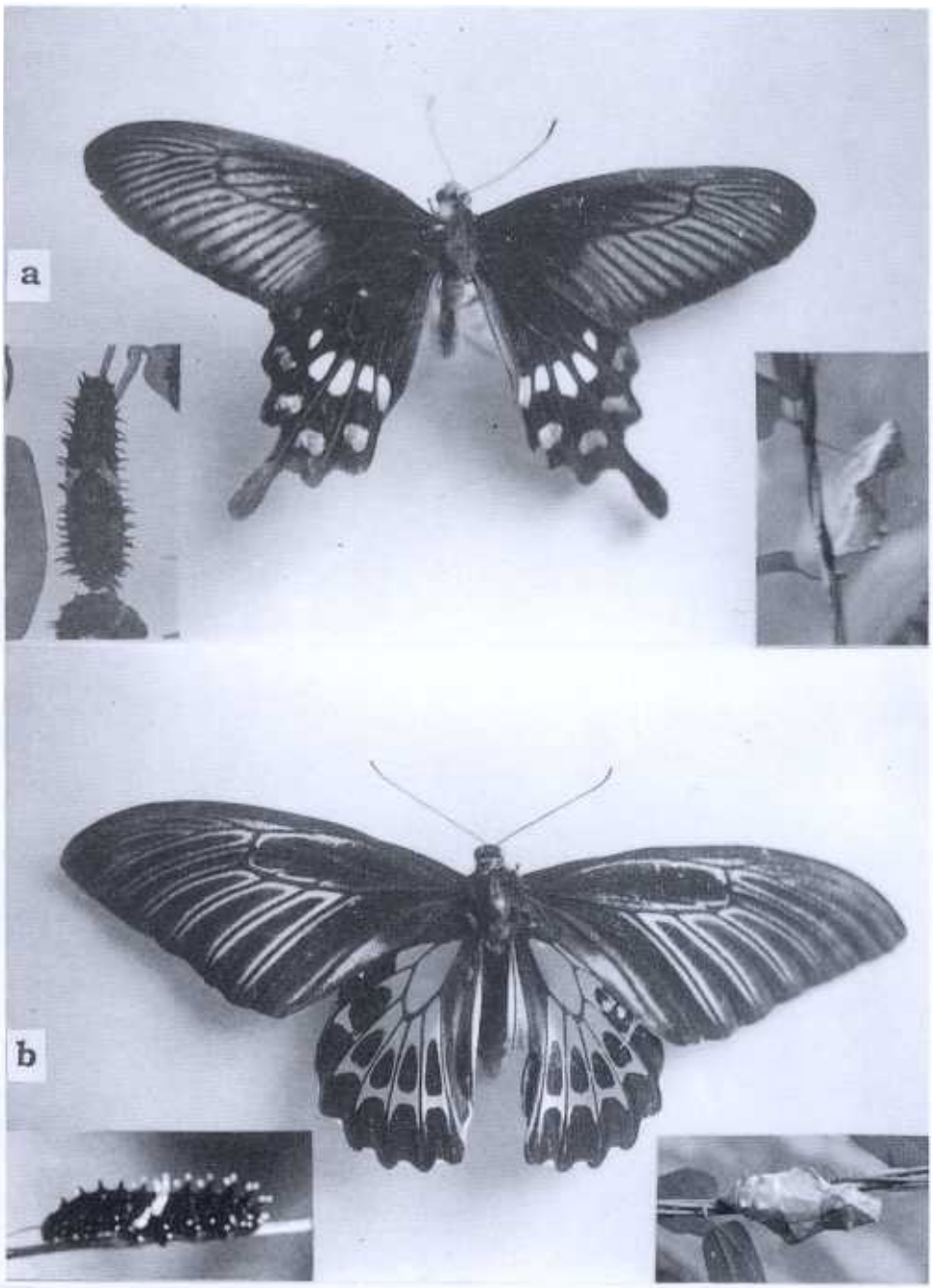

Fig. 4. a. The crimson rose, *Pachliopta aristolochiae*. Inset: Larva and pupa

b. The southern bird wing, *Troides minos*. Inset: Larva and pupa

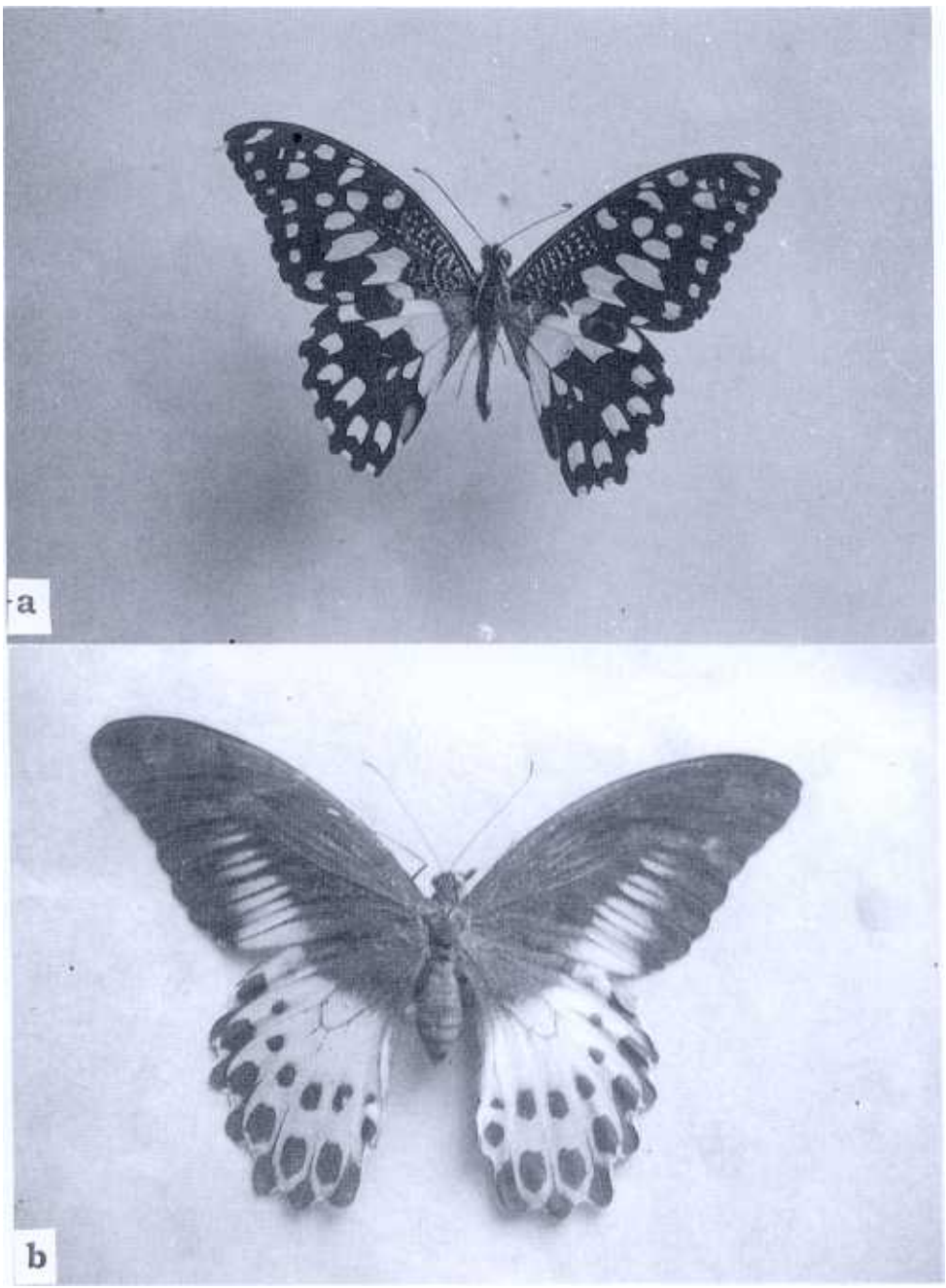

Fig. 5. a. The lemon butterfly, *Papilio demoleus*
b. The blue mormon *Papilio polymnestor*

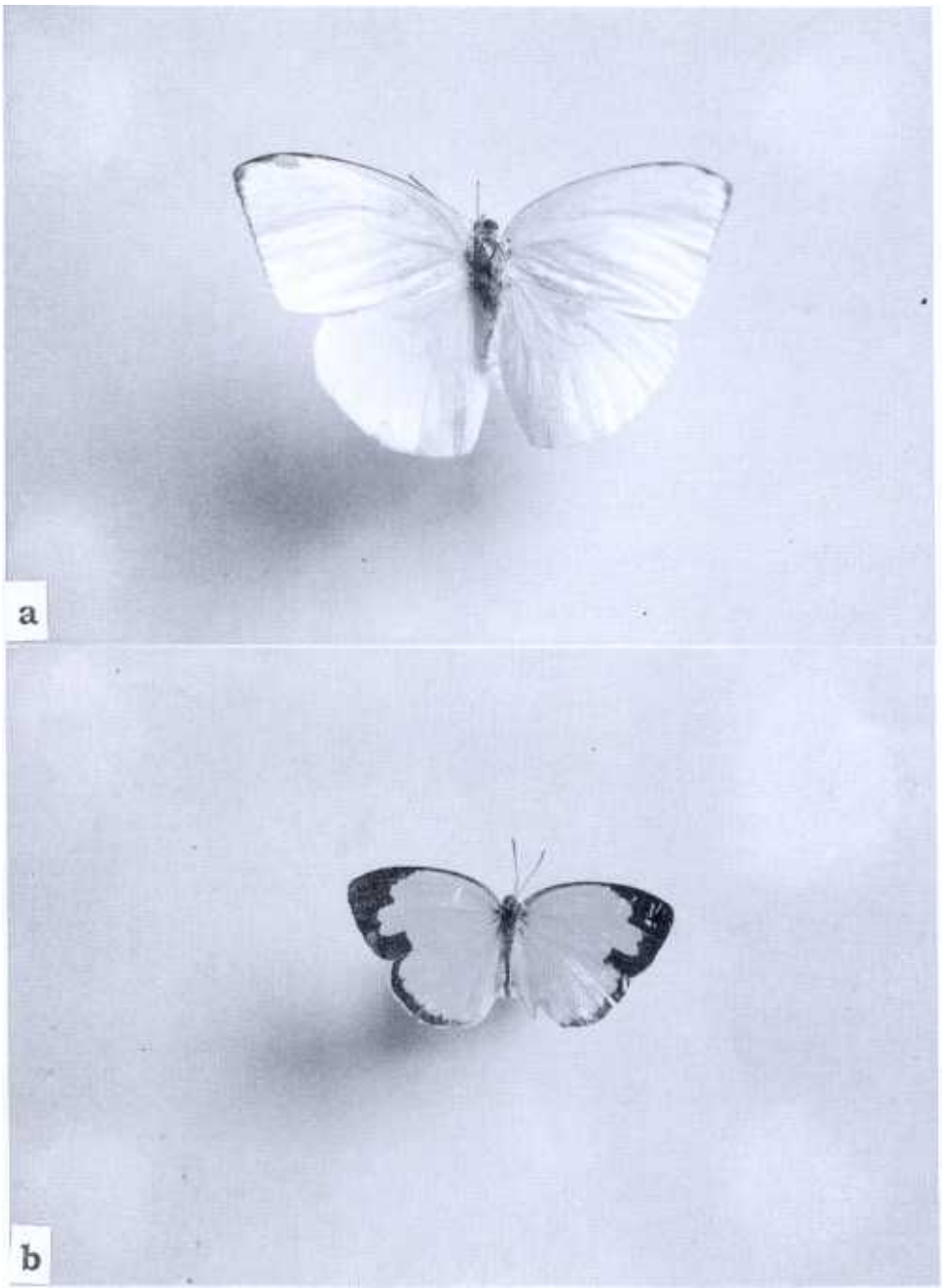

Fig. 6. a. The white, *Catopsilia pomona*
b. The grass yellow, *Eurema hecabe*

Table 2. Butterflies observed in the garden during various mmonths

year and month of observation	Butterfly species	Stage	Host plant
1996 May			
June	*Papilio demoleus*	Larava & adult	Citrus sp.
July	*Troides minos*	Larva	*Aristolochia indica*
	Euploea core	Adult (aggregation)	*Crotalaria retusa*
	Tros hector	Larva	A. *indica*
August	*Troides minos*	Adult	*Clerodendron capitatum*
September	*Euploea core*	Adult (aggregation)	*Crotalaria retusa*
	Parantica nilgiriensis	Adult (aggregation)	*Crotalaria retusa*
October	*Euploea core*	Adult (aggregation)	*Crotaluria retusa*
	Parantica nilgiriensis	Adult (aggregation)	*Crotaluria retusa*
November	*Pachliopta aristolochiae*	Adult (aggregation)	*Aristolochia indica*
	Papilio demoleus	Larva & adult	*Citrus* sp.
	Papilio paris	Adult	*Clerodendron paniculatum*
December	*Pachliopta aristolochiae*	Adult (aggregation)	*Aristolochia indica*
1997 January	*Pachliopta aristolochiae*	Larva	*Aristolochia indica*
February	*Pachliopta aristolochiae*	Larva	
	Moduza procris	Larva	*Mussaenda frondosa*
March	*Pachliopta aristolochiae*	Larva & adult	*Aristolochia indica*
April	"	"	"
May	"	"	"
June	*Parantica nilgiriensis*	Adult (aggregation)	*Crotalaria retusa*
	Euploea core	"	"
July	*Parardica nilgiriensis*		"
	Euploea core	"	"

The butterflies thus released survived for about a weak but no instance of mating and egg laying was noticed. Perhaps the area available within the insectory was not sufficient to induce mating response. The butterfly farms established in Malaysia had large areas (covering over 100m^2) under enclosure so as to provide as much natural space as possible. Even in this case,

the natural build up of butterflies on the host plants was not satisfactory and butterflies had to be introduced into the cage at intervals in order to maintain the population within the cage. Details of butterflies released into the cage area given in Table 3.

Table 3. Details of butterflies released in the insectory

Species	Stage	No. and date of release	Remarks
Tros hector	Larva	7 Nos. 19-7-96	Pupation from 21-7-96 to 23-7-96. Adult emergance from 1-8-96 to 3-8-96
	Adult	4 Nos. 22-7-96	Found dead on 26-7-96
Euploea core	Larva	1 No. 30-10-96	Pupated on 5-11-96. Adult emergance on 15-11-96
Pachliopta aristolochiae	Larva	10 Nos. 24-10-96	Pupation from 28- 10-96 to 30- 10-96 Adult emergance from 5-11-96 to 8-11-96
Troides minos	Larva	2 Nos. 2-7-97	Pupated on 15-7-97. Adult emergance on 2 1-7-97
	Pupa	1 No. 21-7-97	Adult emergance on 28-7-97

CONSTRAINTS FOR BREEDING BUTTERFLIES IN CAPTIVITY

Being a pilot study, attempts were made to evaluate the various requirements for the successful breeding of butterflies in field cages. The constraints faced in this study are discussed below.

Out door cage

In the present study, an insectory in the KFRI campus was made use of. Although butterflies were reared in the laboratory in rearing bottles and oocasionally in small cages, the dimension of cage was found to be important for the success of the breeding programme particularly when the intention is to maintain butterflies in a natural

Standardised strategy for breeding

General information on the biology and ecology of butterflies to be bred, natural mortality factors as well as availability of appropriate larval and adult

host plants are essential for the success of any breeding programme. In the present study, selected butterflies were initially bred in small containers in the laboratory prior to release in the field cage. Predation by lizards and infestation by micro-organisms were the major reasons for the decline of population maintained in the field cage. Instances of 'inbreeding' leading to a loss of vigor due to loss of heterozygosity and fixation of homozygous alleles have been reported in continued breeding programmes. Since most species of butterflies have more than one host plants, care should be taken to select the most appropriate host.

GENERALISED PLANOF A BUTTERFLY HOUSE

A typical butterfly house should have facilities to breed various species in captivity and also to display preserved material in order to create public awareness on species conservation (Fig. 7). A detailed account of facilities required for a butterfly house are given below.

Display area

Insects particularly butterflies form excellent materials for exhibits and hence should be displayed in the front area. The exhibits should be so organised as to give general information on species diversity and its role in ecosystem functioning. Both native and exotic fauna may be exibited (Fig. 8).Commercial products made out of insects, souvenirs etc., also may be exhibited in this area.

Sales counter

Souvenirs and curios made out of insects, plastic models, charts, books, stickers, posters, paintings, insect study and collection kits, T-shirts, badges, bags etc.. form excellent material for sale. The sale proceeds from such items together with gate collections will bring good revenue to make the butterfly house self supporting.

Butterfly release area

The butterflies are generally reared in separate rearing rooms either on their larval host plants or on artificial diets. The butterflies are subsequently left in the release area which is open to the public.

The release area should be developed with care so as to offer conditions suited for the butterflies released (Fig. 9). It may be either a simple net house or a

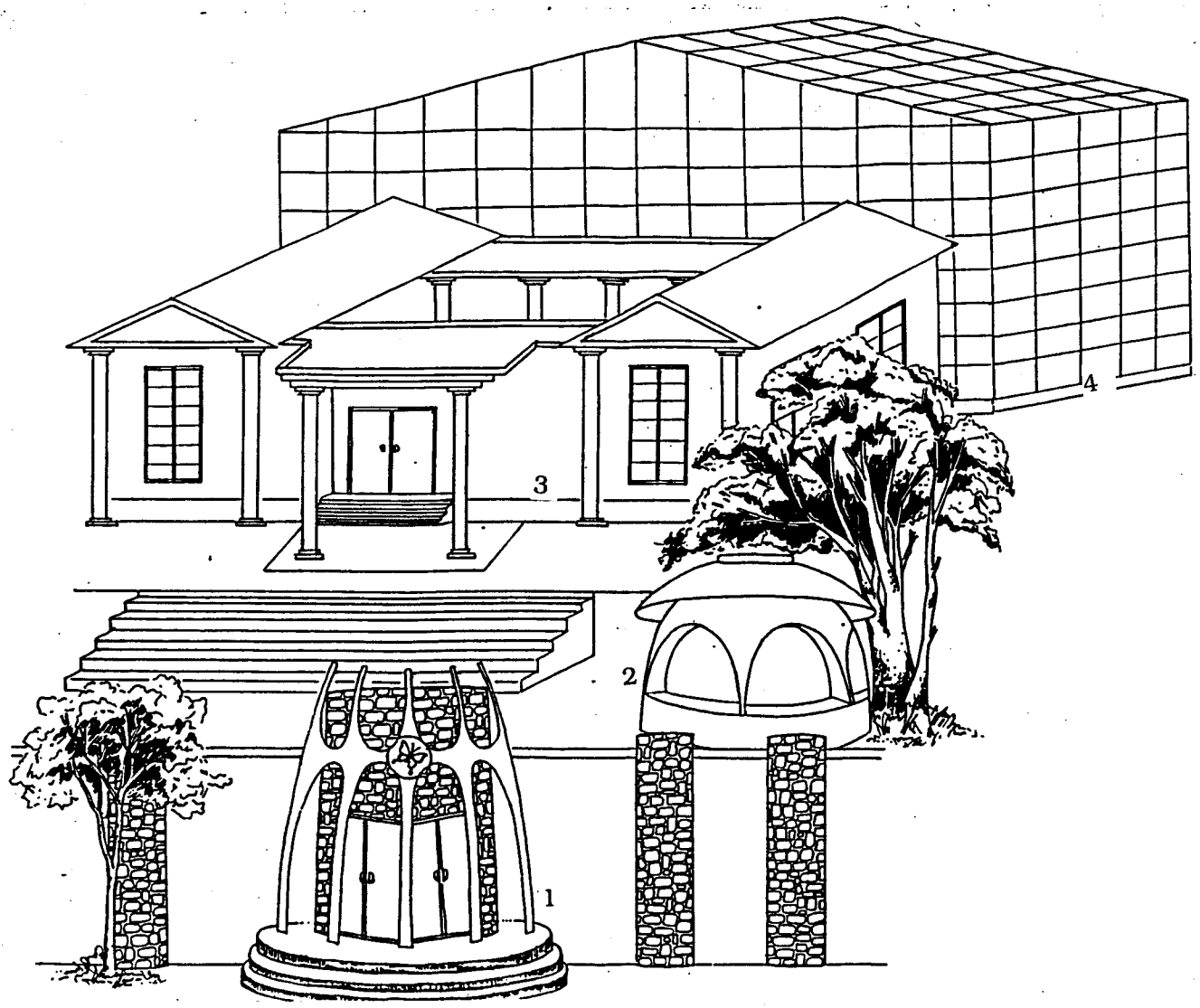

Fig. 7. General plan of a typical butterfly house.
1. Gate, 2. Caffeteria, 3. Sales counter-cum-exhibit area, 4. Butterfly release area

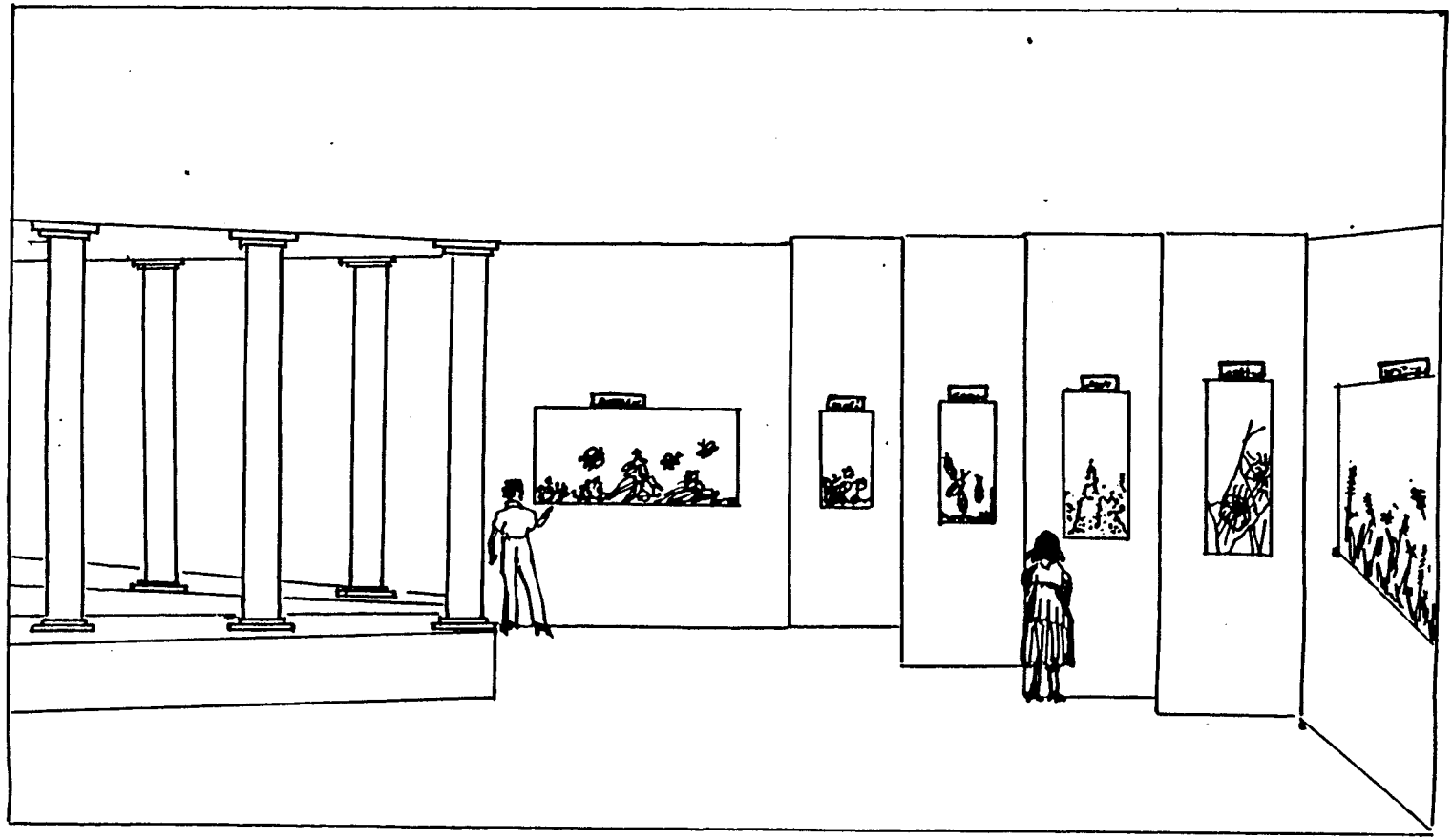

Fig. 8. Display area in a typical butterfly house

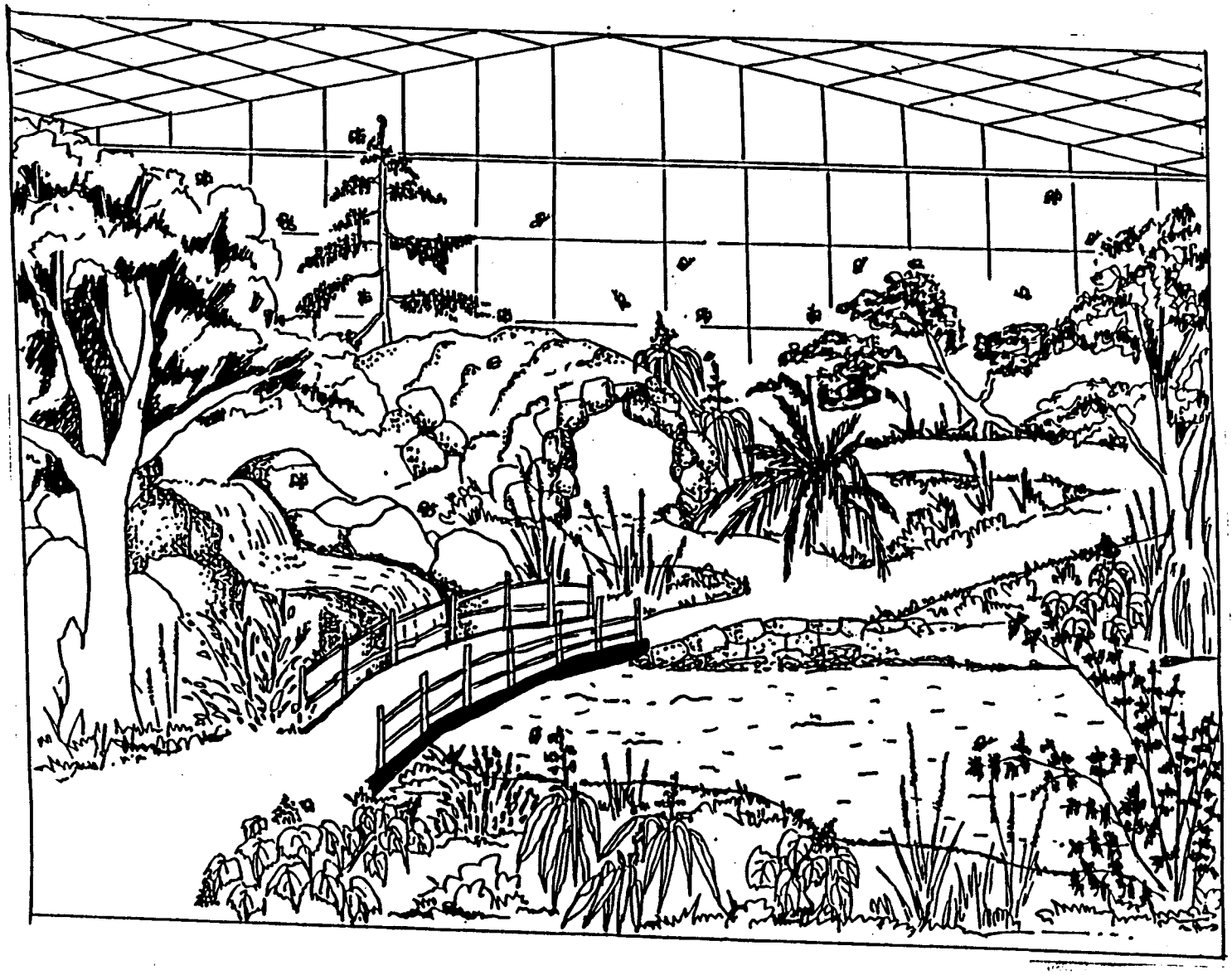

Fig. 9. Inside a butterfly house. Note the properly land-scaped interior offering diverse habitats

glass house with adaptations to regulate temperature, humidity, air movement and day length. Temperature and relative humidity are the most important factors to be taken care of. Temperature ranging from 20-30^{o} seems to be preferrable for most tropical butterflies. Excessive humidity may lead to development of fungal attack. Most species also thrive best at a relative humidity exceeding 90 percent. In addition to these, slight air currents will stimulate them to move about leading to a high frequency of feeding and courtship.

In order to offer conditions for mating and egg laying, appropriate larval and adult host plants should be kept in the release area. As nectar and pollen from this source alone may not be sufficient, provision may also be made for providing artificial food. Generally, sugar solution as soaked cotton wads is kept. In some butterfly houses, the solution is kept in a tube. Colored 'corolla' or plastic flowers are kept around the tube to attract butterflies. Powdered pollen available from bee keepers may also be kept on the 'corolla'. Besides these. over-ripe fruits dusted with sugar, carrion. dung etc., may also be used depending on the species. Sufficient care should be taken to keep the solution, containers and 'corolla' disease free. For this, these may be rinsed in 5% sodium hypochlorite solution before use.

Most of the commercial butterfly houses in the west are walk through heated glass houses fitted with special halide lamps for lighting as daylight is completely cut off. For tropical conditions such arrangements may not be required. Butterfly houses in Malaysia for example, are only enclosures with simple provisions for air regulation and humidity control and do not use much sophesticated techniques as in the west.

PREPARATION OF CURIOS

In many countries like Papua New Guinea, preparation of 'curios' using dead insects has grown into a cottage industry. The wings of many butterflies are very attractive and hence even bits or fragments of wings can be made use of in the preparation of various art works. There is strong criticism in the preparation of such articles mainly due to the fear that this may lead to exploitation of local fauna and may affect even the survival of the species. What is suggested here, is to make use of dead insects that become available in an insectory during routine breeding programmes. It is strongly recommended that no attempt should be made to rear the insects merely for commercial utility. Some general techniques for processing dead butterflies or fragments are discussed below.

Dry mounts

Insects that are not mutilated can be spread on boards and allowed to dry in the air or in the oven at 50-55°CSuch dried material will retain its shape and can be assembled on a board and framed or retained in attractive display boxes. Appropriate fumigants -like naphthalene pellets - may be kept inside the boxes to prevent attack by small insects like psocids. Another problem with dry mounts is fungal attack during wet seasons. If the box is air tight, this problem can be managed to some extent.

Plastination

This is a technique used for preserving biological specimens by embedding in a polyester or epoxy resin. For getting best results the material used should be fresh. The procedure for plastination is as follows. At first. the material is subjected to dehydration by freeze drying in vacuum. This can be achieved by leaving the material in a desicator to which is attached a vacuum pump. Treatment in cold acetone at -25°C will also enhance dehydration. The material is then soaked in a polyester resin to replace the tissue fluid. As the chemical will get polymerised at room temperature. care should be taken to keep the material in the desired shape and after polymerisation the shape can not be altered. The impregnated material is then treated with a hardener or catalyst to hasten the drying of the resin.

Mica-get embedding

This technique is similar to plastination, the only difference being that the material is embedded in a thick film of polyester resin. For this, a glass or mica container with detachable sides is taken into which the resin is slowly added to about 1/4 th of its depth. The dried and set material to be embedded is then kept over the surface. The resin is continuously added till the whole material is thoroughly embedded. While adding the resin care should be taken to prevent formation of air bubbles. Also, the resin should be added with least disturbance so that the material will not lose its natural shape. In order to hasten quick setting of the resin, a catalyst is also added after embedding. When completely dry, the block may be polished using machine.

CONCLUSIONS

Captive breeding of butterflies has economic as well as ecological implications as detiled below.

AS A BUSINESS

In many countries such as Papua New Guinea, Britain and Malaysia, butterfly farming has proven to be a sound, economically viable rural industry. Papua New Guinea's is a successful model that can be readily adopted to other tropical developing countries (Anon., 1983; Hutton, 1985). In that country, there are several village farming and collecting units particularly in areas that are handicapped for the usual agricultural activities, or livestock maintenance. Butterflies are bred in these areas with minimal forest disturbance.

Current estimates indicate that there are between 50 and 60 butterfly houses attracting five million visitors annually, in Britan. Millions of butterflies are sold as specimens or as displays. It has been stated that the gate collections alone exceeded £ 5 million in Britain (Collins, 1987).

AS A TOOL IN CONSERVATION AND ENVIRONMENTAL EDUCATION PROGRAMMES

Invertebrates which form the majority of the life forms on earth have been ignored until recently in zoo education and conservation programmes. During the past decade 'butterfly houses' have become very popular in several countries attracting millions of visitors.

In most environments, invertebrates are more accessible than vertebrates and they offer insights into the dynamics of ecological processes that can raise public awareness and enjoyment (Collins, 1987). The butterflies which are very colorful and attractive rival the most beautiful of the tropical fish, flowers and birds. Butterfly houses can thus promote awareness of the vital ecological roles played by invertebrates and particularly the need to conserve invertebrates as important natural resources.

Captive breeding and maintenance of stock for reintroduction is a method applied in vertebrate conservation. The possibility of invertebrate

tion on the same lines have been suggested by several workers but largely ignored (Cooper, 1986, Morton, 1983). Pyle (1976) states that such measures should be regarded as the last resort. Introduction of species into new areas had also aroused much controversy. Such action, it is stated, would be justified only when a species has become locally extinct or when a species is facing threat of extiction due to habitat destruction.

Several instances of reintroduction of butterflies are known such as the introduction the large copper butterfly *Lycaena dispar* Haw. *batavus* Obth. into Woodwalton Fen during 1927 to replace *L. dispar* Haw. which became extinct towards the middle of the 19th century (Nature Conservancy Council, 1977). Similarly, the heath fritillary *Mellicta athalia*, which became extinct in Essex in about 1890 was reintroduced in the Hadleigh Woods with success (Luckens, 1980). Similarly attempts were also made to introduce the swallow-tail butterfly *Papilio machaon britanicus* at Wicken Fen in 1975. However, such introductions are terribly expensive since all infrastructural facilites for breeding and maintenance of populations have to be built up. Establishment of a Captive Breeding Center is therefore very essential for the succes of such programmes.

Perhaps the most important step in conservation should be legislation against collecting for trade particularly with regard to species that are rare. For this, information on the local fauna , the population density of various species as well as the various natural mortality factors affecting species survival should be known. Only detailed faunistic surveys can bring out these details.

REFERENCES

Anonymous, 1983. Managing Tropical Animal Resources: Butterfly Farming in Papua New Guinea. National Academy Press, Washington D.C.

Collins, N.M. 1987. Butterfly Houses in Britain: The Conservation Implications. IUCN, Cambridge.

Cooper, J.E. 1986. Captive breeding of invertebrates. Int. Zoo Yearbook, 24/25: 74-76.

D'Abrera. Bernard, 1982,'85,'86. Butterflies of the Oriental Region - Part I. (244 p.). Part II (534 p.) & Part III (672 pp.), Hill House, Australia.

Emmel, Thomas C. and Eric Garraway, 1990. Ecology and conservation biology of the Homerus Swallowtail in Jamaica (Lepidoptera : Papilionidae). Tropical Lepidoptera, 1(2): 63-76.

Ford, E.B. 1945. Butterflies. New Naturalist Series. Collins, London.

Gardiner, B.O.C. 1974. On vanishing butterflies. Bull. amat. ent. Soc. . 33: 145-151.

GoI (Government of India), 1982. The Wildlife Protection (Amendment) Act, 1982. Controller of Publications, New Delhi.

Hughes, D.G. and Bennett. P.M. 1991. Captive breeding and the conservation of invertebrates. Int. Zoo Year Book, 30: 45-51.

Hutton, A.F. 1985. Butterfly farming in Papua New Guinea. Oryx, 19: 158-161.

IUCN., 1990. IUCN Red List of Threatened Animals. IUCN. Cambridge.

Khoshoo, T.N. 1984. Prospects of butterfly farming in India. In: Environmental Concerns And Strategies: 236 - 252. Indian Environmental Society. Natraj Publishers, Dehra Dun.

Larsen, Torben B. 1987. The butterflies of the Nilgiri mountains of South India (Lepidoptera: Rhopalocera). *J. of Bombay nat. Hist. Soc.,* 84(1): 26-54: 84(2): 291-376; 84(3):560-584.

Larsen, Torben B. 1988. The butterflies of the Nilgiri mountains of South India (Lepidoptera: Rhopalocera). *J. of Bombay nat. Hist. Soc.,* 85(1): 26-43.

Luckens, C.J. 1980. The Heath Frittillary, *Mellicta athalia* Rott. in Britain. Notes on distribution and ecology. *J. Variation,* 92: 229-234.

Mathew, G. 1990. The Lepidopteran fauna of Silent Valley, pp. In: Ecological Studies and long term Monitoring of Biological Processes in the Silent Valley National Park., Report submitted to DOEN, New Delhi, 193 p. (*mimeo*).

McLeod, L. 1979. A ban on collecting Lepidoptera in the department of the Alpes de Haute - Province, France. *J.Variation,*91 :37-41.

Morton, A.C.. 1983. Butterfly conservation - the need for a captive breeding Institute. *Biol. Conservation.* 24: 19-31.

Nature Conservancy Council, 1977. Woodwalton Fen. Banbury, Oxon: Nature Conservancy Council.

Pearson, M.J. 1992. The butterfly farming and trading industry in the Indo-Australian region and its role in tropical forest conservation. *Tropical Lepidoptera,* 3(Suppl.1): 1-31.

Pollard, E., 1979. Population ecology and change in range of the white admiral butterfly, *Ladoga camilla* L. in England. *Ecol. Ent.* 4: 61-74.

Pyle, R.M. 1976. Conservation of Lepidoptera in the United States. *Biol. Conserv,* 9: 55-75.

Sheldon, W.G. 1925. The destruction of British butterflies. *Entomologist.* 58: 105-112.

Spooner, G.M. 1963. On causes of the decline of *Maculinea arion* Lin. (Lep., Lycaenidae) in Britain. *Entomologist,* 96: 199-210.

Strong, D.R., J.H.Lawton and R. Southwood, 1984. Insects on Plants: Community Patterns And Mechanisms. Blackwell Scientific Publications, Oxford.

Talbot, G. 1939. The Fauna of British India. Butterflies, Vol.I, 600 p.

Talbot, G. 1947. The Fauna of British India. Butterflies, Vol.II, 506 p.

Thomas J.A. 1980. Extinction of the large blue and the conservation of the black hair streak (a contrast of failure and success). Institute of Terrestrial Ecology, Annual Report, 1979, 19-23. London, HMSO.

Van der Made, J. 1987. Butterfly Management. IUCN Bull. spec. rep. 18(7-9): 8.

Wilson, E.O. 1971. The Insect Societies. Cambridge, Belknap Press, Harward University.

Wilson, E.O. 1987. The little things that run the world: the importance and conservation of invertebrates. *Conserv. Biol.* 1: 344-346.

WRI, IUCN and UNEP, 1992. Globai Biodiversity Strategy, 244 p.

Wynter-Blyth, M.A. 1957. Butterflies of the Indian Region. The Bombay Nat. Hist. Soc., Bombay, 523 p.

ZSI, 1988. Records of the Zoological Survey of India.(Silent Valley Special Issue), 84(1-4): 283 p.

Appendix-1

Butterflies recorded from southern India with notes on their distribution and host range (Wynter-Blyth, 1957; D'Abrera, 1982-1986; Larsen, 1987, 1988)

Order\Species	Status	Distribution	Host plant
DANAIDAE Idea (Tree Nymphs)			
Idea malabarica Moore	Common	S. India	*Aganosma cymosa*
Danais (Tigers)			
Parantica aglea (Cramer)	Fairly common	Sri Lanka, S. India, to Poona	*Tylophora* sp., *Cryptolepis buchananii, Calotropis gigantea*
P. nilgiriensis Moore	Common	Nilgiris and hills to the south	
Danaus limniace Cramer	Very common	India, Sri Lanka	*Wattakaka volubilis, Calotropis*, sp., *Marsdenia tenacissima*
Tirumala septentrionis dravidarum Fruh.	Very common	S. India, Sri Lanka	Asclepiads; *Vallaris solanacea*
D. genutia genutia Cram.	Fairly common	India, Sri Lanka	Cynanchum dalhousieae, Ceropegia intermedia, Rhaphistemma pulchellum
D. chrysippus (Lin.)	Very common	Sri Lanka, India	*Calotropis gigantea, C. procera, Asclepias curassavica*
Euploea (Crows)			
Euploea core (Cramer)	Very common	Sri Lanka, India	*Holarrhena pubescens, Nerium oleander, Ichnocarpus fructescens, Streblus asper, Ficus bengalensis, F. racemosa, F. indica, F. religisosa, Hemidesmus indicus, Cryptolepis elegans*
E. sylvester coreta (Godart)	Locally very common	S. India, Sri Lanka	*Ichnocarpus frutescens*
E. klugii kollari Felder and Felder	Rare	Sri Lanka, S. India, Bengal and Konkan	Ficus hispida
SATYRIDAE			
Mycalesis (Bushbrowns)			
Mycalesis anaxias Hewitson	Locally common	Hills of S. India, Coorg	Grasses
M. perseus (Fb.)	Very common	Sri Lanka, India	S. Grasses
M. mineus (Lin.)	Very common	Sri Lanka, Peninsular India	Grasses
M. visala Moore	Locally abundant	S. India	Grasses
M. subdita (Moore)	Locally common	Sri Lanka, Nilgiris, Madras to Orissa, Bangalore	Grasses
M. khasia Evans	Common	Palnis, Shevaroys, Nilgiris, Wynad, Coorg	Grasses
M. adolphei (Guerin)	Fairly common	Nilgiris, Coorg	Grasses
M. oculus Marshall	Common	Hills of S. India (South of Nilgiris)	Grasses
M. patnia Moore	Common	Sri Lanka, S. India to Mysore and North Kanara	Grasses
Lethe (Tree browns)			

Lethe europa	Rather rare	S. India	
L. rohria	Common	Sri Lanka, S. India	Bamboo
L. drypetis	Common	Sri Lanka, S. India	
Ypthima (The Rings)			
Ypthima chenui	Common	Coorg, Hills of S. India	
Y. ceylonica	Locally abundant	Sri Lanka	
Y. avanta	Common	Sri Lanka, Peninsular India	Grasses
Y. philomela	Locally common	Nilgiris, Wynad	
Y. baldus	Very common	S. India	
Zipoetis (The Catseyes)			
Zipoetis saitis Hewitson	Local	Slopes of W. Ghats	*Lantana camara*
Orsotriaena (The Nigger)			
Orsotriaena medus (Fb.)	Common	Sri Lanka, S. India	Grasses
Melanitis (Evening browns)			
Melanitis leda (Drury)	Very common	All India, Sri Lanka	Grasses
M. phedima Cramer	Common	Sri Lanka, S. India	Grasses
M. zitenius (Herbst.)	Rare	S. India	Bamboos
Parantirrhoea (The Travancore evening brown)			
Parantirrhoea marshalli Wood Mason	Extremely local	Travancore, Coorg	*Ochlandra rheedii*
Elymnias (The Palmflies)			
E. hypermnestra Lin.	Common	Sri Lanka, Peninsular India	Palms
AMATHUSIDAE			
Amathusia (The Palmking)			
Amathusia phidippus (Johanssen)	Very rare	Travancore	Palms
Discophora (The Duffers)			
Discophora sondaica tullia (Cramer)	Very rare	N. Kanara	Bamboos
D. lepida (Moore)	Rare	Sri Lanka, S. India	Bamboos
NYMPHALIDAE			
Charaxes (The Rajahs)			
C. bernardus imna (Cramer)	Common	Peninsular India, W. Ghats, Nilgiris, Wynad	*Saccopetalum tomentosum, Tamarindus indica*
C. solon solon Fb.	Rare	Sri Lanka, India	*Tamarindus indica, Caesalpinia spicata*
Polyura (The Nawabs)			
P. schreiberi (Godart)	Very rare	W. Ghats, Coorg, Travancore	*Caesalpinia spicata, Rourea minor*
P. athama athama S (Drury)	Common	Sri Lanka, Peninsular India	*Delonix regia, Caesalpinia* spp., *Albizia* spp., *Adenanthera pavonina*
Rohana (The Emperors)			

Rohana parisatis Fruh.	Common	Sri Lanka, W. Ghats, Nilgiris, Palni hills of Travancore Ghats, Nilgiris, Palnis	*Celtis tetrandra*
Euthalia (The Barons)			
Tanaecia lepidea (Butler)	Very rare	S. India	*Careya arborea, Melastoma malabathricum*
E. telchinia (Menetries)	Very rare	Coorg	
E. alonthea meridionalis Fruh.	Common	Sri Lanka, India	*Mangifera indica, Anacardium occidentale, Bryonia* spp. *Scurrula parasitica, Streblus asper*
E. lubentina (Cramer)	Rare	Sri Lanka, Peninsular, India	*Dendrophthoe falcata*
E. evelina (Stoll)	Rare	Sri Lanka, S. India	*Diospyros candolleana, D. melanoylon, Anacardium occidentale*
Parthenos (The Clipper)			
Parthenos sylvia Cramer	Common	Sri Lanka, W. Ghats, Nilgiris	*Modecca* sp., *Tinosperma cordifolia*
Moduza (The Admirals)			
Moduza procris (Cramer)	Common	Sri Lanka, Peninsular India	*Cinchona, Ochreinauclea missionis, Mussaenda frondosa, Wendlandia exserta, W. notoniana, Mitragyna parvifolia, Neolamarckia cadamba*
Athyma (The Sergeants)			
Athyma nefte Cramer	Common	S. India	*Glochidion* spp.
A. selenophora (Kollar)	Generally scarce	W. Ghats, Coorg	*Haldinia cordifolia*
A. ranga (Moore)	Rare	W. ghats, Nilgiris, Mysore, Palni, Wynad	*Olea dioica, Chionanthus*
A. perius (Linneaus)	Generally rare in India	Hills of Peninsular India	*Glochidion velutinum, G. lanceolatum*
Neptis (The Sailors)			
Neptis columella	Rare	W. Ghats, Coorg, Nilgiris, Palnis	*Dalbergia* sp.
N. viraja kanara Evans	Rare	India, Burma, Thailand, Andamans	
N. nata hampsoni Moore	Rare	India, Oriental region	
N. clinia kallaura Moore	Common	S. India, Nepal, Southern China	
N. jumbah	Common	Sri Lanka, S. India	*Xylia xylocarpa, Pongamia glabra, Dalbergia* sp., *Caesalpinia spicata, Bombax ceiba, Thespesia populnea, Hibiscus* sp., *Grewia* sp., *Elaeocarpus* sp., *Zizyphus* sp.
N. hylas	Very common	India, Sri Lanka	*Paracalya* sp., *Flemingia* sp., *Mucuna* sp., *Xylia* sp., *Canavalia mollis, Vigna unguicula, Grewia* sp., *Triumfetta* sp., *Corchorus* sp., *Bombax* sp., *Helicteres* sp., *Nothopodytis nimmoniana*
N. soma	Rare	W. Ghats, Hills of S. India	
Pantoporia (The Sergeant)			
Neptis nata	Rare	S. India	
P. hordonia stoll	Common	S. India	
Cyrestis (The Map butterflies)			

Cyrestis thyodamas Boisduval	Common	W. Ghats, Coorg, Wynad, Nilgiris, Palani	*Ficus religiosa, F. benghalenisis, F. racemosa*
Hypolimnas (The Eggflies)			
Hypolimnas bolina (Lin.)	Common	India, Sri Lanka	*Laportea interrupta; Elatostemma cunneatum, Portulaca oleracea*
H. misippus (Lin.)	Common	India, Sri Lanka	*Portulaca oleracea, Abutillon* sp.; *Hibisicus* sp.
Doleschallia (The Autumn leaf)			
Doleschallia bisaltide (Cramer)	Rare	Sri Lanka, W. Ghats, Nilgiris	*Acanthaceae*
Kallima (The Oakleaf butterflies)			
Kallima philarchus (Westwood)	Common	Sri Lanka, S. India	*Strobilanthes* spp.
K. horsfieldi Kollar	Rare	W. Ghats	
Junonia The Pansies)			
Junonia hierta (Fb.)	Very common	Sri Lanka, India	*Hygrophila auriculata, Barleria* sp.
J. orithyia (Lin.)	Very common	Sri Lanka, India	*Justicia procumbens, J. micrantha, Lepidagathis prostrata*
J. lemonias (Lin.)	Common	Sri Lanka, India	*Nelsonia campestris, Hygrophila auriculata, Corchorus* sp., *Sida rhombifolia*
J. almana (Lin.)	Common	Sri Lanka, India	*Hygrophila auriculata, Barleria, Hygrophila, Osbeckia* sp.
J. atlites (Johanssen)	Locally common	Sri Lanka, wetter regions of Peninsular India	*Hygrophila auriculata, Barleria*
J. iphita (Cramer)	Common	Sri Lanka, South and Central India	*Strobilanthes callosus, Justicia micrantha, H. auriuclata*
Vanessa (The Vanessas)			
Vanessa cardui (Lin.)	Common	Sri Lanka, India	*Zornia gibbosa, Artemisia* sp. *Blumea* sp. *Debregeasia* sp.
V. indica (Herbst)	Common	Sri Lanka, Hills of S. India, Coorg	*Girardinia heterophylla*
Kaniska			
Kaniska canace (Johanssen)	Common	Sri Lanka, Hills of S. India, Coorg	*Smilax* sp., Wild Yams
Argyreus (The Fritillaries)			
Argyreus hyperbius (Johanssen)	Common	Sri Lanka, Nilgiris, plains and hills of Cochin, Travancore	*Viola* sp.
Phalanta (The Leopards)			
Phalanta phalantha (Drury)	Common	India, Sri Lanka	*Flacourtia indica, F. montana, Aberia gardneri, Smilax* sp., *Salix* sp.
P. alcippe (Cramer)	Common	Sri Lanka, W. Ghats	*Alsodeia zeylanica*
Cupha (The Rustic)			
Cupha erymanthis (Drury)	Common	Sri Lanka, S. India	*Flacourtia indica, F. montana*
Vindula (The Cruiser)			
Vindula erota (Fb.)	Common	Sri Lanka, W. Ghats, Palnis, Nilgiris	*Adenia palmata*
Cirrochroa (The Yeoman)			
Cirrochroa thais (Fb.)	Common	Sri Lanka, W. Ghats, Coorg, Wynad, Nilgiris, Palnis	*Hydnocarpus pentandra*

Cethosia (The Lacewings)			
Cethosia nietneri Felder	Common	Sri Lanka, W. Ghats	*Adenia palmata*
Ariadne (The Castors)			
Ariadne ariadne (Johanssen)	Common	Sri Lanka, India	*Tragia involurata, T. cannabina, Ricinus communis*
A. merione (Cramer)	Common	Sri Lanka, India	*Tragia involucrata, T. cannabina, Ricinus communis*
ACRAEIDAE			
Acraea (The Tawny coster)			
Acraea violae (Fb.)	Common	Sri Lanka, India	Cultivated passion flower, *Adenia palmata, Passiflora foetida, Hibiscus cannabinus, Cucurbits*
LIBYTHEIDAE			
Libythea (The Beaks)			
Libythea myrrha Godart	Common	Sri Lanka, S. India	*Celtis tetrandra*
L. lepita Moore	Rare	Sri Lanka, S. India	*Celtis australis*
RIODINIDAE			
Abisara (The Judies)			
Abisara echerius (Stoll)	Common	Sri Lanka, Peninsular India	*Embelia robusta, Ardisia* sp.
LYCAENIDAE			
Spalgis (The Apefly)			
Spalgis epius (Westwood)	Common	Sri Lanka, W. Ghats, Coorg, Bangalore	Carnivorous on *Coccidae*
Talicada (The Red pierrot)			
Talicada nyseus (Guerin)	Locally abundant	Sri Lanka, S. India	*Bryophyllum calycinum, Kalanchoe laciniata*
Castalius (The Pierrots)			
Castalius rosimon (Fabricius)	Common	Sri Lanka, India	*Zizyphus rugosa, Z. jujuba*
Caleta			
C. caleta (Hewitson)	Common	Sri Lanka, Peninsular India	*Zizyphus rugosa*
Discolampa			
Discolampa ethion (Doubleday and Hewitson)	Common	Sri Lanka, S. India	*Zizyphus oenoplia, Z. jujuba*
Tarucus (The Blue pierrots)			
Tarucus ananda (de Niceville)	Rare	Nilgiris, Palnis, Annamalai Hills	*Zizyphus xylopyrus, Loranthus* spp.
T. nara	Common	Sri Lanka, S. India	*Zizyphus jujuba*
Syntarucus (The Zebra-blue)			
Syntarucus plinius Fb.	Common	Sri Lanka, India	*Albizia lebbek, Indigofera* spp., *Sesbania aculeata*
Azarus (The Babul blues)			
Azanus ubaldus (Cramer)	Common	India, Sri Lanka	*Acacia arabica, A. leucophloea*
A. uranus Butler	Not common	S. India	*Acacia senegal*
A. jesous (Guerin)	Common	Sri Lanka, India	*Acacia farnesiana, A. leucophloea*
Neopithecops (The Quaker)			
Neopithecops zalmora (Butler)	Common	Sri Lanka, S. India	*Glycosmis mouritiana*

Megisba (The Malayan)			
M. malaya thwaitesi		S. India	
Acytolepis (The Hedge blues)			
Acytolepis puspa	Common	Sri Lanka, Peninsular India	*Cylista scariosa, Xylia dolabiformis, Hiptage madablate, Schleichera trijuga*
A. lilacea	Rare	Nilgiris, Palnis, Coorg, Sri Lanka	
Udara akasa	Locally common	Sri Lanka and hills of S. India	
Celatoxia albidisca	Fairly common	Hills of S. India	
Celastrina lavendularis	Common	S. India, Sri Lanka	
Chilades (The Lime blue)			
Chilades lajus (Cramer)	Common	Sri Lanka, India	*Limonia acidissima*, young shoots of orange
C.pandava (Horsfield)	Locally common	India, Sri Lanka	*Xylia xylocarpa, Cycas revoluta*, Lime etc.
C. parhasius	Common	Indian sub continent	
Freyeria			
Freyeria trochylus	Common	Sri Lanka, India	*Lotus corniculatus, Indigo peapoda, Vetches* sp, *Rhynchosia minima, Heliotropium strigosum*
Pseudozizeeria			
P. maha	Common	S. India	*Oxalis corniculata, Tephrosia pauciflora, Nelsonia* sp., *strobilanthes* sp.
P. lysimon	Common	Sri Lanka, India	*Zornia gibbosa, Amaranthus viridis*
Zizula hylax hylax Fb.	Common	Sri Lanka, India	*Nelsonia campestris, Lantana camara*
Zizina			
Zizina	Common	India, Sri Lanka	*Zornia gibbosa, Sesbania aculeata, Alysicarpus vaginalis*
Euchrysops (The Plains cupids)			
Euchrysops cnejus (Fabricius)	Common	India, Sri Lanka	*Ougenia dalbergioides, Phaseolus trilobus, Paracalyx scariosa, Butea frondosa*, Acacia, Peas, Beans, Grams, and *Vigna unguiculata*
E. contracta (Butler)	Common	Sri Lanka, S.India	
Catachrysops			
Catachrysops strabo (Fb.)	Common	India, Sri Lanka	*Ougenia dalbergioides, Paracalyx scariosa, Schleichera oleosa*
Lampides (The Pea blue)			
Lampides boeticus (Lin.)	Very common	India, Sri Lanka	*Butea frondosa, Crotalaria capensis, Melotus* sp., beans, peas
Anthene			
Anthene emolus (Godart)	Rare	S. India	*Combretum latifolium, Terminalia paniculata, Trichilia connaroides, Saraca indica, Cassia fistula, Litchi chinensis*
A. lycaenina Felder	Rare	S. India, Sri Lanka	*Caesalpinia spicata, Acacia pennata, Buchanania lanzan, B. angustifolia*
Jamides (The Ceruleans)			

J. celeno	Common	India, Sri Lanka	*Pongamia glabra, Abrus precatorius, Saraca indica, Butea frondosa, Trichilia connaroides*
J. alecto	Common	Sri Lanka, S. India	*Kaempferia pandurata, Elettaria cardamoum*
J. bochus bochus Cramer	Common	Sri Lanka, S. India	Pongamia glabra, Xylia xylocarpa, Crotalaria sp., *Butea frondosa; Vigna unguiculata, Tephrosia candida*
Nacaduba (The Line blues)			
Nacaduba pactolus	Rare	Coorg, Nilgiris, Sri Lanka	
N. hermus	Common	Sri Lanka, India	
N. kurava	Rare	Sri Lanka, India	*Embelica tsjeriam-cottam, Ardisia solanacea, Waltheria indica*
N. beroe	Common	Sri Lanka, India	*Caesalpinia spicata*
N. calauria	Rare	Sri Lanka, S. India	
N. berenice ormistoni Toxopeus	Common	Sri Lanka	
Prosotas			
P. nora	Common	India, Sri Lanka	*Acacia caesia, Combretaceae, Myrtaceae, Sapindaceae*
P. dubiosa indica Evans	Common	Oriental region	
P. noreia	Very rare	Sri Lanka, S. India	
Petrelaena			
Petrelaea dana	Common	Sri Lanka, S. India	
Ionolyce			
Ionolyce helicon	Rare	Sri Lanka, India	
Curetis (The Sunbeams)			
Curetis thetis (Drury)	Common	Sri Lanka, Peninsular India	*Pongamia glabra, Derris scandens, Xylia xylocarpa, Abrus precatorius, Trichilia connaroides*
C. dentata (Moore)	Common	S. India	
C. siva	Rare	Sri Lanka, Coorg, Mysore, Nilgiris, Travancore	*Ougenia dalbergioides*
Iraota (The Silverstreak blues)			
Irota timoleon (Stoll)	Common	S. India	*Punica granatum*
Amblypodia (The Leaf blue)			
Amblypodia anita Hewitson	Common	Sri Lanka, Peninsular India	*Olea* sp.
Thaduka (The Many-tailed Oak blue)			
Thaduka multicaudata (Moore)	Rare	Kanara, Coorg, Malabar, W. slopes of Nilgiris	*Trewia nudiflora*
Arhopala (The Oak blues)			
Arhopala bazaloides	Very rare	W. Ghats	
A. amantes	Locally common	Sri Lanka, S. India	*Terminalia crenulata, T. paniculata, T. catappa, Lagerstroemia microcarpa, L. hirsuta, Hopea jucunda*
A. pseudocentaurus	Common	Sri Lanka, S. India	*Terminalia crenulata, T. paniculata, Lagerstroema microcarpa, Xylia xylocarpa*
A. canaraica	Very rare	Travancore, Nilgiris, Coorg, Kanara	

A. abseus	Very rare	Sri Lanka, Kanara, India, *Shorea robusta*	
Surendra (The Acacia blues)			
Surendra quercetorum Moore	Fairly common	Sri Lanka, W. Ghats, Palnis, Nilgiris	*Acacia pennata, A. caesia*
Zinaspa			
Z. todara Moore	Rare	Nilgiris, Kannara	
Loxura (The Yamfly)			
Loxura atymnus (Cramer)	Common	Sri Lanka, Nilgiris, Palnis, Coorg, Shevaroys, Travancore Cochin Hills	*Dioscorea pentaphylla, Smilax* sp.
Spindasis (The Silverlines)			
Spindasis vulcanus	Common	India, Sri Lanka	*Canthium parviflorum, Zizyphus rugosa, Z. jujuba*
S. lilacinus Moore	Rare	Mysore, Bangalore	
S. schistacea	Common	S. India, Sri Lanka	
S. ictis	Locally common	Sri Lanka, India	
S. elima	Rare	India, Sri Lanka	
S. abnormis Moore	Rare	South India	
S. lohita	Common	Sri Lanka, W. Ghats, Nilgiris, Palanis, Bangalore	*Terminalia paniculata, Xylia, Dioscoreapentaphylla, Convolvulaceae*
Zesius (The Redspot)			
Zesius chrysomallus Hubner	Common	Sri Lanka, Peninsular India	*Terminalia paniculata, Pterocaprus marsupium, Anacardium occidentale, Psidium guava,* Loranthaceae
Ancema			
Ancema blanka (de Niceville)	Rare	S. India	*Viscum angulatum, V. capitellatum*
Pratapa (The Tufted royals)			
P. deva (Moore)	Rare	S. India, Sri Lanka	*Scurrula parasitica, Taxillus tomentosus, Dendrophthoe falcata*
Creon			
C. cleobis (Godart)	Rare	S. India, W. Ghats, Coorg, Nilgiris	*Loranthus elasticus, Viscum capitellatum*
Tajuria (The Royals)			
Tajuria melastigma de Niceville	Rare to very rare	N. Kanara, Nilgiris	
T. jehana Moore	Common	Sri Lanka, S. India	
T. maculata Hewitson	Common	S. India	
T. cippus (Fb.)	Fairly common	India, Sri Lanka	*Dendrophthoe falcata, L. elasticus, Helixanthera wallichiana*
Eliotia (The Mandarin blues)			
Rachana jalindra (Horsfield)	Very rare	S. India, (N. Kanara, Coorg, Nilgiris)	*Loranthes elasticus*
Cheritra (The Common imperial)			
Cheritra freja (Fb.)	Common	Sri Lanka, W. Ghats	*Xylia xylocarpa, Saraca indica, Cinnamomum* sp., *Ixora* sp.
Rathinda (The Monkey puzzle)			

Rathinda amor (Fb.)	Common	Sri Lanka, S. India	*Hopea* sp., Loranthus, Croton, Blachia, *Schleichera* sp., *Litchi chinensis*, *Careya* sp., *Eugenica zeylanica*
Horaga (The Onyxes)			
Horaga onyx (Moore)		Scarce in S. India, Sri Lanka	*Coriaria nepalensis*
H. viola Moore	Scarce	S. India	*Coriaria nepalensis*
Catapaecilma (The Tinsels)			
Catapaecilma elegans (Druce)	Common	Sri Lanka, S. India	*Terminalia paniculata*
Hypolycaena (The Tits)			
Hypolycaena nilgirica Moore	Very rare	Sri Lanka, Nilgiris, Palnis	
H. othona (Hewitson)	Rare	W. Ghats	Orchids, *Cottonia peduncularis*, *Aerides crispum*, *Rhynchostylis retusa*
Zeltus (The fluffy tit)			
Zeltus amasa amasa Hewitson	Not common	W. Ghats	
Deudorix (The Cornelians)			
Deudorix epijarbas (Moore)	Rare	Sri Lanka, India	*Pomegranate fruits*, *Sapindus trifoliatus*, *Aesculus indicus*, *Connarus* sp.
Virachola			
Virachola isocrates (Fb.)	Common	Sri Lanka, S. India	Fruits of *Catunaragam spinosa*, *Eriobotria japonica*, *Psidium guava*, *Tamarindus indica*, *Strychnos nux-vomica*, *Limonia acidissima*, *Punica granatum*
V. perse (Hewitson)	Common	Sri Lanka, S. India	Fruits of *Catunaragam spinosa*
Rapala (The Flashes)			
Rapala varuna	Rare	Sri Lanka, S. India	Flowers of *Zizyphus xylopyrus*, *Z. rugosa*, *Quisqualis indica*, *Sapindus trifoliata*
R. manea schistacea	Common	Sri Lanka, India	Flowers of *Spiraea sorbifolia*, *Antidesma acidum*, *Zizyphus*, *Acacia pennata*, *A. caesia*, *Quisqualis indica*, Tea blossoms
R. lankana	Very rare	Sri Lanka, W. Ghats, Nilgiris	
R. iarbus Fb.	Common	Sri Lanka, S. India	Flowers of *Ougenia dalbergioides*, *Zizyphus* sp.
Bindahara (The Plane)			
Bindahara phocides (Moore)	Rare	S. India, Sri Lanka	Inside fruits of *Salacia macrosparma and S. reticulata*
PAPILIONIDAE			
Troides (The Birdwings)			
Troides minos Cramer	Common	S. India	Aristolochia indica, Apama siliquosa
Pachliopta (The Red bodied swallow tails)			
Pachliopta pandiyana Moore	Locally common	W. Ghats	*Apama siliquosa*
P. hector (Lin.)	Common	S. India	*Aristolochia indica*
P. aristolochiae (Fb.)	Very common	India, Sri Lanka	*Aristolochia indica*
Chilasa (The Mimes)			
Chilasa clytia (Lin.)	Common	S. India, Sri Lanka	*Alseodaphne semicarpifolia*, *Cinnamomum zeylanicum*, *Litsea tomentosa*, *L. glutinosa*

Papilio (The Black-bodied swallowtails)			
Papilio polymnestor Cramer	Common	Sri Lanka, S. India	*Citrus decumana, Glycomis mouritiana, Atalantia* spp.
P. paris Lin.	Common	W. Ghats, Oriental region	*Evodia* sp.
P. crino Fb.	Rare	Sri Lanka, S. India	*Chloroxylon swietenia*
P. buddha Westwood	Local and generally rare	W. Ghats	*Zanthoxylum rhetsa*
P. dravidarum Wood-Mason	Rare	W. Ghats	*Glycosmis mouritiana*
P. helenus Lin.	Common	Sri Lanka, W. Ghats	Cultivated citrus, *Zanthoxylum rhetsa, Glycosmis mouritiana*
P. polytes Lin.	Very common	Sri Lanka, India	Cultivated citrus *Glycosmis mouritiana, Citrus medica, Aegle marmelos, Zanthoxylum rhetsa, Murraya koenigii*
P. liomedon Moore	Rare	W. Ghats	*Acronychia pedunculata*
P. demoleus Lin.	Very common	Sri Lanka, India	*Cultivated citrus, Ruta graveoleus Aegle mormelos, Glycosmis mouritinana*
Pathysa			
Pathysa nomius (Esper)	Common	Sri Lanka, Peninsular India	*Saccopetalum tomentosum, Polyalthia longifolia*
P. antiphates (Cramer)	Rare	Sri Lanka, S. India	*Desmos lawii*
Graphium (The kite swallowtails)			
Graphium sarpedon (Lin.)	Common	Sri Lanka, S. India	*Persia oderatissima, P. micrantha Cinnamomum zeylanicum, Camphora officinalis, Litsea chinensis, L. salicifolia, Alesodaphne semicarpitulia, Litsea salicifolia*
G. doson (C. & R. Felder)	Common	Sri Lanka, S. India	*Saccopetalum tomentosum, Desmos lawii, Polyalthia longifolia, Cinnamomum* sp.
G. agamemnon (Lin.)	Common	Sri Lanka, S. India	*Saccopetalum tomentosum, Anona muriacata, A. squamosa, A. discolor, A. reticulata, Polyalthia longifolia, Saccopetalum* sp. *Gautheria* sp.
PIERIDAE			
Leptosia (The Psyche)			
Leptosia nina (Fb.)	Common	India, Sri Lanka	*Capparis rheedii, Crataeva magna*
Delias (The Jezebels)			
Delias eucharis (Drury)	Common	Sri Lanka, India	*Loranthus elasticus, Scurrula parasitica, Dendrophthoe falcata*
Cepora (The Gulls)			
Cepora nerissa (Fb.)	Common	Sri Lanka, India	*Capparis decidua, C. sepiaris, C. rheedii, C. zeylanica*
C. nadina (Lucas)	Common	Sri Lanka, W. Ghats	*Capparis roxburghii, C. moonii, C. rheedii*
Prioneris (The Saw-tooths)			
Prioneris sita (C.&.R. Felder)	Generally	Sri Lanka, W. Ghats	*Capparis zeylanica*
Anaphaeis			
Anaphaeis aurota (Fb.)	Common	Sri Lanka, India	*Capparis decidua, C. sepiaria, C. rheedii, Cadaba indica, Macrua arenaria*
Appias (The Puffins and Albatrosses)			
Appias indra (Moore)	Rare	Sri Lanka, S. India	*Drypetes* sp.

A. libythea (Fb.)	Common	Sri Lanka, S. India	*Crataeva magna, Capparis sepiaria, C. roxburghii, C. zeylanica*
A. lyncida (Cramer)	Scarce and local	S. India, Sri Lanka	*Crataeva magna, Capparis roxburghii*
A. albina (Boisduval)	Common	Sri Lanka, S. India	
A. wardi (Moore)	Rare	S. India	*Drypetes venusta*
Artogeia			
Artogeia canidia (Sparrman)	Very common	Nilgiris, Palni hills, Cochin and Travancore	Cruciferae
Ixias (The Indian orange tips)			
Ixias marianne (Cramer)	Common	Sri Lanka, Peninsular India	*Capparis sepiaria, C. divaricata, C. decidua, C. grandis*
I.pyrine (Lin.)	Common	Sri Lanka, Peninsular India	*Capparis sepiaria*
I. pyrene sesia Fb.	Common	Sri Lanka, India, Hong Kong, Malaysia	
Colotis (The Arabs and Small orange tips)			
Colotis amata Fb.	Common	Sri Lanka, India	*Salvadora persica, S. oleoides, Azima tetracantha*
C. fausta (Olivier)	Common	Penisular India	*Maerua oblongifolia*
C. etrida (Boisduval)	Common	Sri Lanka, Palnis	*Cadaba indica*
C. eucharis (Fb.)	Common	Sri Lanka, Peninsular India	*Cadaba indica*
C. danae (Fb.)	Common	Sri Lanka, Peninsular India	*Cadaba indica, Maerua oblongifolia, Capparis sepiaria, C. divaricata*
Hebomoia (The Great orange tip)			
Hebomoia glaucippe (Lin.)	Common	Peninsular India, Sri Lanka	*Crataeva magna, Capparis mooni*
Pareronia (The Wanderers)			
Pareronia ceylanica (C. & R. Felder)	Common	Sri Lanka, Mysore, W.Ghats, Nilgiris	
P. valeria (Cramer)	Common	India	
Catopsilia (The Emigrants)			
C. pomona (Fb.)	Very common	Sri Lanka, India	*Cassia fistula, C. siamea, C. tora, Butea frondosa, Bauhinia racemosa*
C. pyranthe (Lin.)	Very common	Sri Lanka, India	*Cassia tora, C. auriculata, C. occidentalis*
Eurema (The Grass yellows)			
Eurema brigitta (Cramer)	Very common	Sri Lanka, India	*Cassia kleinii*
E. laeta Boisduval	Very common	India, Sri Lanka	Leguminosae
Eurema hecabe (Lin.)	Very common	India, Sri Lanka	*Cassia tora, C. fistula, Caesalpinia spicata, Pithecolobium dulce, Sesbania aculeata, Caesalpinia* spp., *Albizia* spp.
E. blanda Boisduval	Common	Sri Lanka, Peninsular India	*Caesalpina spicata, Delonix regia, Cassia* spp. *Albizia* spp.
E. andersoni Moore	Rare	Sri Lanka, Peninsular India	
Colias (The Clouded yellows)			
Colias nilagiriensis Felder & Felder	Common	Hills of S. India	Parochetus communis

HESPERIPDAE			
Celaenorrhinus (The Flats)			
Celaenorrhinus leucocera (Kollar)	Common	S. India	*Eranthemum roseum, Ecbolium viride, Strobilanthes callosus, S. angustifrons*
C. ruficornis (Mabille)	Common	W. Ghats, Nilgiris, Palnis	*Strobilanthes callosus*
C. ambareesa	Common	S. India	*Strobilanthes callosus, Eranthemum roseus, E. purpurascens*
Tagiades (The Snow flats)			
Tagiades gana silvia Evans	Common	S. India	Dioscorea oppositifolia
T. japetus Mabille	Common	Sri Lanka, Nilgiris, Shevaroys, Palnis	
T. litigiosa Moschler	Common	Sri Lanka, Peninsular India	*Dioscorea oppositifolia, Smilax*
Coladenia (The Pied flats)			
Pseudocoladenia dan (Fb.)	Common	S. India	*Achyranthes aspera*
P. indrana indra Evans	Rare	Sri Lanka, S. India, Nepal, Burma	
Sarangesa (The small flats)			
Sarangesa dasahara (Moore)	Common	Sri Lanka, S. India	*Asystasia* spp., *Blepharis asperrima*
S. purendra pandra Evans	Common	Indian sub-continent	
Odontoptilum (The Chestnut angle)			
Odontoplilum angulata (Felder)	Common	Peninsular India	*Allophylus cobbe*
Caprona (The Golden angle)			
Caprona ransonnetti (Felder)	Common	S. India	*Helicteres isora*
C. alida vespa Evans	Rare	Sri Lanka, S. India, Nepal, South China and Hong Kong	
Spialia (The Indian skipper)			
Spialia galba (Fb.)	Common	India, Sri Lanka	*Waltheria indica, Sida rhombifolia, Hibiscus* sp.
Hasora (The Common banded awl)			
Hasora chromus Cramer	Common	India, Sri Lanka	Pongamia glabra, *Ricinus communis, Trichilia trifoliata*
H. taminatus (Hubner)	Common	W. Ghats, Coorg, Palnis, Nilgiris, Sri Lanka	*Derris scandens*
H. badra (Moore)	Common	Sri Lanka, W. Ghats	*Derris uliginosa*
Ismene (The Orange awlet)			
Ismene jaina (Moore)	Fairly	W. Ghats, Sri Lanka	*Combretum latifolium*
Bibasis (The Orange tail awl)			
Bibasis sena (Moore)	Rare	Sri Lanka, Coorg, Nilgiris	*Combretum latifolium, Hiptage madablota*
Badamia (The Brown awl)			
Badamia exclamationis (Fb.)	Common	India, Sri Lanka	*Terminalia bellirica, Combretum ovalifolium, Chionanthes purpurea, Ficus* spp.
Suastus (The Indian palm Bobs)			
Suastus gremius (Fb.)	Common	India, Sri Lanka	Palms

S. minuta bipunctus Swinhoe	Common	Sri Lanka, S. India, Sikkim, Philippines and Java	
Arnetta (The Bobs)			
Arnetta vindhiana (Moore)	Common	South to Central India	
A. mercara Evans	Rare	W. Ghats	
Matapa (The Common red eye)			
Matapa aria (Moore)	Common	S. India	Bamboos
Erionota (The Palm red eye)			
Erionota thra (Hubner)	Very rare	S. India	*Musa sapientium*
Taractrocera (The Grass darts)			
Taractrocera maevius (Fb.)	Common	India, Sri Lanka	Grasses
T. ceramas (Hewitson)	Common	W. Ghats, Hills of S. India	Grasses
Aeromachus (The Scrub hoppers)			
Aeromachus pygmaeus (Fb.)	Common	Nilgiris, Wynad, Coorg (S. India)	Grasses
Ampittia (The Bush hoppers)			
Ampittia dioscorides (Fb.)	Fairly common	Sri Lanka, Peninsular India	Grasses, Paddy
A. pygmaeus Fb.	Common	S. India	
Telicota - (The Palm darts)			
Telicota colon Fb.	Common	Sri Lanka, India	Sugarcane
T. ancilla Moore	Common	Sri Lanka, India	Bamboos
Oriens (The Dartlets)			
Oriens goloides (Moore)	Common	S. India, Sri Lanka	*Grasses*
O. concinna (Elwes)	Rare	Shevaroys, Nilgiris, Palnis, Coorg	
Potanthus (The Darts)			
Potanthus pseudomaesa Moore	Abundant	Plains of India, Sri Lanka	*Grasses*
P. confucius Evans	Abundant	Sri Lanka, Hills of S. India	
P. pallida Evans		Sri Lanka, S. India, China and Yunan	
P. palnia Evans	Abundant	S. Indian hills	
P. pava pava Fruhstofer		S. India, Himachal Pradesh and Oriental region	
Halpe			
Halpe homolea (Hewitson)	Common in S. India	Travancore, S. India, Palni, Nilgiris, Wynad, Bangalore, Sri Lanka	Bamboos
H. moore Watson	Common	Nilgiris, Coorg	
H. honorei de Niceville	Rare	Palnis, Nilgiris, Trichinapally, Coorg	
Baracos (The Hedge hoppers)			
Baracus vittatus (Felder)	Common	Sri Lanka, Nilgiris, Palnis, Travancore Hills	
B. hampsoni Elwes	Common	W. Ghats	Grasses

***Baoris* (The swifts)**			
Baoris farri	Common in S. India	W. Ghats	Bamboos
Caltoris			
Caltoris canaraica	Common	Coorg, Wynad, N. Kanara	Bamboos
C. philippina	Rare	Nilgiris, Coorg, N. Kanara, Sri Lanka	Bamboos
C. kumara	Common	W. Ghats, Sri Lanka	Bamboos
Polytremis			
Polytrema lubricans	Not common	Travancore, Nilgiris, Wynad, Coorg	
P. lubricans lubricans Herrich Schaffer		W. Ghats, Kumaon, China, Sula Islands	
Pelopidas			
Pelopidas conjuncta	Common	Sri Lanka, Peninsular India	Bamboos and grasses
P. subochracea	Rare	Sri Lanka, Coorg, Palnis, Nilgiris	Grasses
P. mathias	Very common	Sri Lanka, India	Grasses
P. guttatus	Very common	Sri Lanka, India	Grasses
P. agna Moore	Common	Oriental region	
Borbo			
Borbo cinnara	Common	Sri Lanka, India	Grasses
B. bevani	Locally common	S. India	
Notocrypta (The Demons)			
Notocrypta paralysos (Wood Mason)	Fairly common	Sri Lanka, W. Ghats	*Scitaminae*
N. curvifascia (Felder)	Common	Sri Lanka, W. Ghats, Mysore, Palni	*Kaempferia rotunda, Zingiber cossumnar, Curcuma decipiens*
Udaspes (The Grass demon)			
Udaspes folus (Cramer)	Common	Sri Lanka, S. India	Curcuma decipiens, Grasses
Hyarotis (The Tree flitter)			
Hyarotis adrastus (Cramer)	Rare	Sri Lanka, W. Ghats	*Phoenix aculis*
H. microstictum coorga Evans			
Psolos (The Coon)			
Psolos fuligo (Mabille)	Common	W. Ghats	*Phrynium*
Iambrix (The Chestnut bob)			
Iambrix salsala (Moore)	Common	Sri Lanka, S. India	Grasses