

## Captive Breeding of Butterflies

Techniques adopted at Regional Science Centre, Guwahati

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### Abstract

For the first time in India, experiments in Captive breeding of butterflies started with scientific approach at National Council of Science Museums, Kolkata (NCSM) in the year 1993. After four years of continuous experimentation, first captive breeding facility of the country was established at Science City, Kolkata and second such effort was undertaken at Regional Science Centre, Guwahati. Captive breeding of butterflies needs well planned houses, climate control measures, larval food plant nursery etc. Besides these, techniques to rear and protect caterpillars, pupa and butterflies, keeping butterfly houses free from pests, quarantine methods to be adopted, butterfly handling techniques and production management, play crucial role in sustained breeding of butterflies. Techniques used in breeding of butterflies like Common mormon (*Princeps polytes*), Lime butterfly (*Princeps demoleus*), Plain tiger (*Danaus (Anosia) chrysippus*), Common crow (*Euploea core*), Psyche (*Leptosia nina*) Common grass yellow (*Eurema hecabe*) were discussed in detail in this paper. Role of butterfly gardens in imparting environmental education and ecological conservation programmes of Science Centre were also discussed.

### Introduction

Butterflies are also called flying flowers. People of all age groups love them alike because of their colours and beauty. There are many butterfly parks both in open and captive all over the world. These parks are run by many Zoos and private breeders. This is being done by zoos to create awareness about butterflies among people and private breeders for economical purposes. Large scale illegal trading of butterflies by means of catching them from wild, habitat destruction and pollutants in the atmosphere affecting these creatures immensely. All round efforts are being made in various countries to stop such practices by way of making laws and creating awareness among students and general public. Till recent past, no such efforts were undertaken in India.

Although there are some studies on butterflies, they are mostly dealt with morphology of butterflies, their habitats and behaviour. Not many studies are there on breeding of butterflies in the Indian context, specially on captive breeding. First scientific effort was started in India in NCSM in the year 1993 for the species

which are not in any schedule of Wild Life Act 1972. To begin with, caterpillars of different species were reared in coffee cups by providing larval food plant leaves. In the year 1997, first butterfly house was developed to breed common species of butterflies which are not in the wildlife schedule, in order to create awareness among general people and students at Science City premises. It was a success and visitors appreciated this effort. In 2004, second such effort was taken up at Regional Science Centre, Khanapara, Guwahati with the experience gained at Science City in captive breeding of butterflies. In 2006, another butterfly breeding facility came in Bangalore Zoo, Bannerghatta.

### Butterfly House and Caterpillar Nursery

A 15' H x 30' L x 15' W butterfly house was built with transparent resin sheet on the roof to receive maximum natural sunlight. Temperature (28°C–32°C) and humidity (80%-90%) maintained in the butterfly house. All the doors and windows are fitted with stainless steel wire mesh. Mesh size of these nets are 2 mm so that no predators can enter inside the house. Inlet and exhaust fans are fitted to provide natural air flow inside the house. Butterfly house and nursery are fitted with metal halide lights to provide near day light conditions. Mud puddles, nectar feeders and flowery plants along with natural plants are arranged inside the house. Caterpillar and Pupa Nursery is fitted with



Fig. 1. Butterfly House (outside)

climate control equipment along with caterpillar rearing and pupa boxes. Temperature and humidity maintained in the nursery are 28°C–32°C and 80%-95% humidity respectively. It is found that these



Fig. 2. Butterfly House (inside view)

climatic ranges gave best results when the caterpillars are growing and also during hatching of butterflies.

### Climate Control Methods

Both butterfly house and nursery were climatically controlled in order to provide best suitable conditions for butterflies. Besides this, recreated real natural environment is made to prevent predators from entering in to these houses and to keep them free from pollutants. This helped in keeping suitable environment irrespective of changing weather conditions outside these houses. This was done with the help of thermostat fitted heaters with blowers to keep temperatures in control during winter months. These houses are also equipped with air conditioners along with shade clothes on top of the butterfly and caterpillar houses to keep the temperatures at required level during summer months of the year. Humidity is controlled manually by spraying water in summer and in winter by keeping mild hot water. These measures helped in creating most favourable conditions to the butterflies throughout the year.

### Butterfly Breeding and Rearing Techniques

Butterflies chosen for captive breeding are –

1. Common mormon (*Princeps polytes*)
2. Lime butterfly (*Princeps demoleus*)
3. Plain tiger [*Danaus (Anosia) chrysippus*]
4. Common crow (*Euploea core*)
5. Psyche (*Leptosia nina*)
6. Common grass yellow (*Eurema hecabe*)

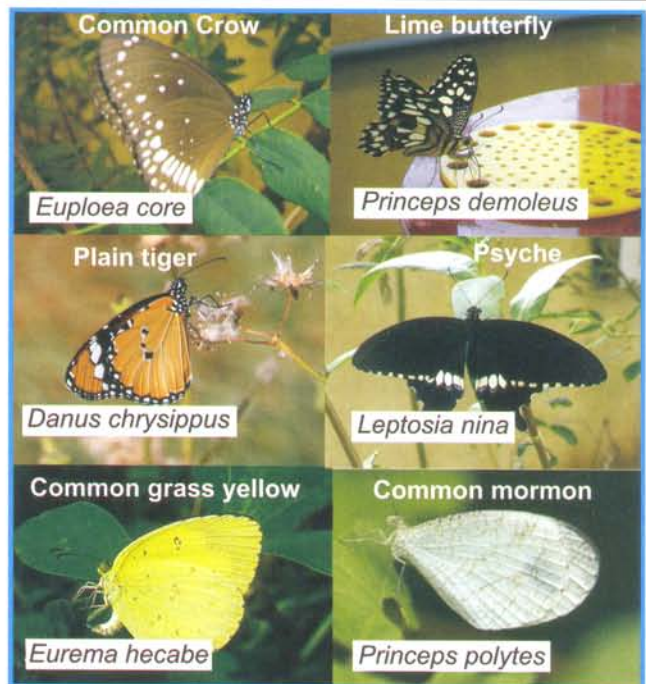


Fig. 3 Butterflies chosen for breeding at RSC, Guwahati

### Techniques Adopted in Breeding Butterflies

These are all common species, easy to rear and their host plants are easily available in nurseries. Male and female species of above butterflies were released inside the house. Host plants like citrus species for common mormon and lime butterflies, capparid species for psyche butterfly, cassia species for common grass yellow, calotropis species for plain tiger and ficus and nerium species for common crow butterflies were kept in the butterfly house to allow the butterflies to lay eggs.

Host plants with eggs were shifted from the butterfly house to nurseries where caterpillars hatched after 5-6 days depending on the species. Once caterpillars started feeding these leaves, defoliated host plants were replaced with new host plants with full foliage so that caterpillars get sufficient food throughout their growth period, till they become pupa. Just before the caterpillars reached pupa stage, these host plants were shifted to wooden cages so that caterpillars do not roam all over the room. Once the caterpillars transformed in to pupa, they were removed gently from these boxes and placed in pupa boxes where they were allowed to develop in to butterflies and hatch. This entire process of metamorphosis i.e. hatching from egg to formation of pupa takes about 3 weeks but it varies from species to species.



Fig. 4. Larval food plants



Fig. 5. Nectar plants

Handling techniques for hard species like common mormon, lime, plain tiger and common crow (strong species) are different from small and delicate species like psyche, common grass yellow. Species like common mormon, lime, plain tiger, blue tiger and common crow are relatively large in size, they are hardy in their body built and easy to handle where as species like common grass yellow and psyche are small in size and very delicate. Hard species caterpillars can be collected with our hands and can be reared in caterpillar boxes. Caterpillar boxes are stuffed with host plant leaves so that caterpillars get their food throughout their development.

Delicate species like common grass yellow and psyche should not be handled as far as practicable. They were allowed to grow and pupate on their host plants. Finally, when they were about to hatch, they were covered with a mosquito net. Butterflies were allowed to hatch on their host plants and released in the exhibition area by removing the net from the host plants. This has become possible only because host plants of these butterflies are relatively small and easy to handle. Picking of caterpillars and pupae may cause injury to them. Another method adopted in handling pupae of these butterflies was, cutting the branches where they have formed and hanging them with the help of crocodile clips in pupa boxes. Difficulty with this method is, while transferring butterflies from these boxes to exhibition area there is a chance of getting damaged due to bad handling. Pupae of common crow, plain tiger, common mormon and lime butterflies were collected gently from the host plants and kept in the pupa boxes. These boxes are equipped with thermocol strips with holes and crocodile clips, in which pupae were placed for hatching. Newly hatched butterflies were allowed in their pupa boxes till they dry their body and wings and blood is pumped in the wings. Handling them when they are wet may lead to crippling of their wings and body. From pupa to hatching of butterflies takes about 6-7 days. This again depends on the size of the butterflies.

### ***Role of Butterfly Gardens in Environmental Education and Ecological Conservation Programmes***

A live butterfly garden in the Science Centre helps in many ways in imparting environmental education. With such facility, we can conduct the following activities in the Centre.

- a) Explain the entire life cycle of a butterfly which is also an insect and represents largest animal

group under the Phylum Arthropoda. Butterflies are liked by all age groups and they help in attracting visitors to the science centres. Various modifications undertaken by these small creatures to attain the form of a butterfly, e.g. eggs, different stages of caterpillar, moulting process, pupation and hatching into butterfly can be shown to the visitors. Also to explain habitats required for these creatures to the students and general masses.

- b) Butterflies are biological indicators of nature. Their presence in an area indicates the presence of their host and nectar plants, and also that the surrounding environment is clean and free from pollutants. We can create awareness among students from the young age.
- c) Regional Science Centre, Guwahati utilized the butterfly house in creating awareness among students to rear caterpillars till they become butterflies and release them in their suitable habitats. With these activities many students started joining hobby camps conducted by this Centre.
- d) Most importantly, role of butterflies in agriculture by way of pollination in plants and in food chain can be explained to museum/science centre visitors.
- e) We can create awareness among people regarding need for conservation of these creatures and their habitats in order to save them from reaching endangered list.
- f) We can also explain various biological control measures. Different species of caterpillars feeding on larval food plants, thereby controlling the growth of these plants. In the process along with larval food plant leaves, they are destroying other insect eggs like aphid eggs etc.

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