

LIFE CYCLE OF THE LARGE SALMON ARAB BUTTERFLY *COLOTIS FAUSTA* (LEPIDOPTERA: RHOPALOCERA: PIERIDAE)

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ABSTRACT

The life cycle of the large salmon arab *Colotis fausta* from Eastern ghats of India was investigated. The population index of eggs, larvae and pupae on the host plant *Cadaba fruticosa* was recorded. The number of broods yearly was estimated i.e., from 10-12. Life cycle from egg to adult emergence was spanning over 19-26 days.

INTRODUCTION

Butterflies are a vital part of the life support system. They play a vital role as pollinators and on this account they are migratory to the top of conservation biology agenda (New *et al.*, 1995). In order that any conservation management programme to be effective requires sound knowledge of the butterfly and ecology of all butterflies in an area. Such knowledge in most cases of Indian butterflies is seriously inadequate (Gay *et al.*, 1992; Venkata Ramana, 2010). For this we describe here the details of life cycle with the population index of eggs, larvae and pupae for better conservation.

MATERIALS AND METHODS

Field areas were regularly searched for the reproductive activity of the large salmon arab butterfly *Colotis fausta* was found laying eggs on the *Cadaba fruticosa*. The eggs with the leaf material were brought to the laboratory and incubated, and further developmental stages were followed, and the success rates of egg hatching, larval and pupal development was also recorded. Young leaves were supplied daily to the growing larvae. Particulars of the larval, pupal stages and the time of adult emergence were recorded from close observations. Searches were made every month for recording the different life stages - egg, larvae, pupae on 20 plants of *C. fruticosa* to work out the population index.

RESULTS AND DISCUSSION

Copulating pairs were noticed mostly during 0900 – 1500 h of the day. Pairing lasted for more than two hours. The breeding female laid eggs singly on both surfaces of young and soft leaves of *Cadaba fruticosa*, sometimes on growing stems and floral parts also. The eggs were oval in shape, and light orange

in color. They measured 1.40 - 2.00 (1.80 ± 0.30) mm in height and 0.80 – 1.00 (0.90 ± 0.70) mm in diameter. Hatching took place after 3 - 4 days of incubation. Color of eggs became dull on the day of hatching. The larvae passed through five distinct instars.

Instar I: This stage lasted 2 - 3 days. On the first day of hatching, the instar measured 1.20 - 1.40 (1.30 ± 0.20) mm in length. By the time it moulted, it was 2.00 - 3.50 (2.7 ± 0.40) mm long. Its body was green in color with small hairs. The head was round with a diameter of 0.30 – 0.40 (0.35 ± 0.10).

Instar II: This stage also lasted 2 - 3 days. The larva grew to 4.00 - 5.50 (4.70 ± 0.20) mm in length. Its head size increased to 0.40 – 0.50 (0.45 ± 0.10) mm. Now the head also had small hairs.

Instar III: This stage also lasted 2 - 3 days. It grew to 9.00 - 11.00 (10.0 ± 0.40) mm in length. Its head measured 0.50 - 0.60 (0.55 ± 0.10) mm in diameter. A green line began to appear mid-dorsally on the body. On the lateral sides of the body, there were yellowish green patches developing. Body surface was rough and hairy, with green color.

Instar IV: This stage lasted 2 - 3 days. It attained a length of 13.00 - 16.00 (14.50 ± 0.60) mm and a width of 1.30 - 1.80 (1.50 ± 0.20) mm. The head was 0.70 - 0.90 (0.80 ± 0.30) mm in size. The yellowish green patches on the lateral sides were clearly seen. Ventrally it was yellowish green in color. Body segmentation was clear.

Instar V: This stage also lasted 2 - 3 days. The instar progressed to a length of 22.00 - 24.00 (23.00 ± 0.80) mm and a width of 2.00 - 2.80 (2.40 ± 0.30) mm. Its head was dark green in color and was 1.20 - 1.50 (1.30 ± 0.20) mm in size. The body segments had transverse skin folds; hence the larva had wrinkled appearance.

The fully grown fifth instar prepared itself for pupation by

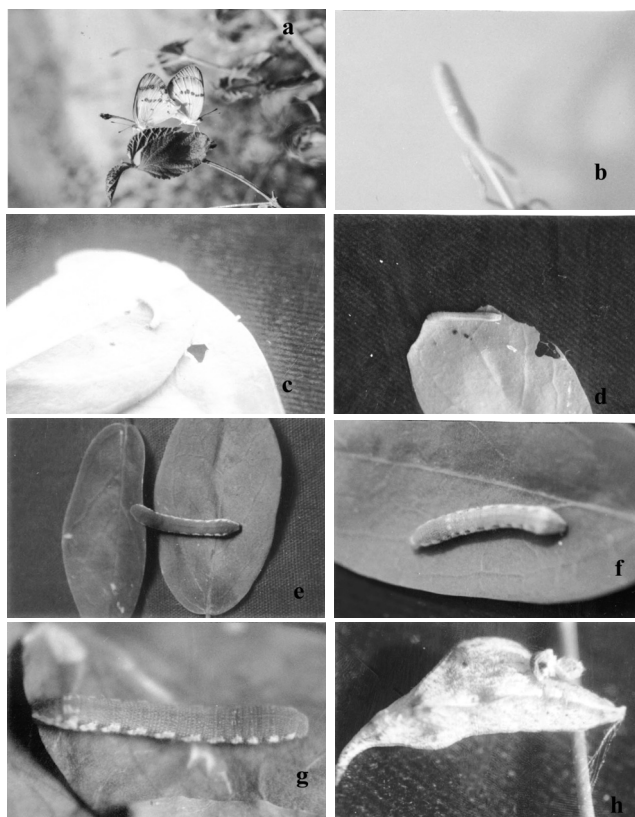


Figure 1: Life stages of *Colotis fausta*

(a) Adult pairing; (b) Egg; (c) Instar I; (d) Instar II; (e) Instar III; (f) Instar IV; (g) Instar V; (h) Pupa

stopping feeding, and contracting its body. It then measured 19.00 - 20.00 (19.50 ± 0.70) mm in length. The process took place for a day. The pupal stage proper lasted 5 - 6 days. It measured 13.00 - 15.00 (14.00 ± 0.20) mm in length and 5.00 - 6.00 (5.50 ± 0.10) mm in width at its broadest region. Anterior end of the pupa was pointed. Its posterior end was broad. It was pale brown in color, with dark brown patches here and there.

Based on the observed duration of life of eggs, larvae, and pupae, it could be estimated that the time required for the egg to develop to the adult was 19 - 26 days (egg 3 - 4; larva 10 - 15; pupa 6 - 7).

The eggs of *Colotis fausta* could be located on the host plant and collected for experimental studies from June - February. The hatching success of eggs varied between 50 - 100%, with a higher rate during July - December. The success rate of larvae becoming pupae varied between 66 - 100%; a higher rate of success was observed between July - November. Pupal developmental success resulting in adult emergence varied between 50 - 100%, with higher rate between July - November.

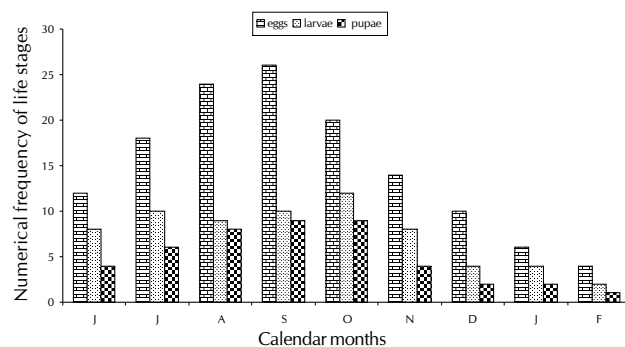


Figure 2: Month-wise distribution and numerical frequency of three different life stages of *Colotis fausta* on *Cadaba fruticosa*

All the life stages were noticed during June - February. There was a higher density of the life stages during July - November. Thus, both laboratory study of success rate of development of the three life stages and their distribution on the host plant indicated that the period during June - February was very congenial for the adults to be on wings, mate and reproduce Fig. 2.

The total development from egg stage to adult emergence of butterfly estimated to be 19-26 days. Although this butterfly species was stated to be active throughout the year (Kunte, 2000) the study could spot the eggs, larvae and pupae on the oviposition host only from June to February with a higher frequency during July - November (Fig. 2). During this period laboratory study of success rates of development yielded 50-100% hatching, 66-100% larval survival and 50-100% pupal development. Thus a voltinism pattern with 10-11 broods yearly is expected for this large salmon arab butterfly *Colotis fausta*.

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