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Observations on the Biology of Type-species, *Colotis amata* (Fabricius), the Small Salmon Arab (Papilionoidea : Pieridae)

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ABSTRACT : *Salvadora oleoides* (Salvadoraceae) has been recorded as the host plant of *Colotis amata* from arid areas north-west India The gross morphology and duration of various life history stages has been recorded. The larval and oviposition behaviour has been studied in details.

Keywords: *Colotia amata*, Pieirdae, life history, behaviour.

INTRODUCTION

Genus *Colotis* Huebner belongs to group of African genera, which is extended into arid parts of India via south Arabia and in India it is represented by eight species (Varshney, 1993). In the present studies, observations have been made on the life history and behavior of the type-species *Colotis amata* (Fabricius) in arid areas of Punjab (India). Bell (1909) and Wynter-Blyth (1957) have reported *Salvadora persica*, *Salvadora oleoides* and *Azima tetracantha* as the larval host plants of this species. During the course of present studies, *Salvadora oleoides* (Salvadoraceae) has been recorded its host plants from arid areas north-west India, where this species is quite rare. The present intensive and extensive survey work undertaken in the area reveals that the species, *Colotis amata* (Fabricius) is very rare and warrant conservational measures for its survival.

OBSERVATIONS

Study sites: Kansal forest, Napli forest (Chandigarh); Pakhrali (Ropar).

LIFE HISTORY STAGES AND DEVELOPMENTAL TIME

Egg: Incubation period : 1.66 ± 0.57 days.
Height 0.77 ± 0.24 mm, width 0.46 ± 0.02 mm; laid in loose clusters, each with 50-60 eggs, the latter evenly spaced within clutch, firmly glued to leaf surface; egg spindle-shaped, narrower at poles than middle; creamy when freshly laid, soon turns yellow on exposure to sunlight; vertical ribs prominent, extend on (egg) surface from micropyle to base, intersected by numerous diffused transverse ribs, resulting in somewhat rectangular pattren on chorion surface; micropyle shallow, narrow, encircled by high longitudinal ridges.

Larva: Number of instars : 5.
Larval duration : 10.15 ± 2.13 days.

First instar: Duration : 1.16 ± 0.28 days.
Head: Width 0.27 ± 0.00 mm; hypognathous; black; epicranial suture very clear; stemmata 2-5 present on clark papillae; primary setae black.
Body: Length 1.99 ± 0.44 mm, width 0.30 ± 0.07 mm; cream coloured when freshly hatched, later becomes green, anal segment yellow green; well segmented; legs green.

Second instar: Duration : 1.33 ± 0.28 days.
Head: Width 0.43 ± 0.04 mm; same as above.
Body: Length 3.80 ± 0.29 mm, width 0.60 ± 0.00 mm; pale green; segments divided into annulets; rest as explained above.

Third instar: Duration: 1.66 ± 0.57 days.
Head: Width 0.79 ± 0.06 mm; turns green; black colour confined to a pair of Iarge, nearly circular spots on vertex, present adjacent to epicranial suture and extending up to epicranial notch; sutures green.

Body: Length 7.33 ± 1.52 mm, width 1.02 ± 0.04 mm; middorsal white band appears, distinct in thoracic and anterior abdominal segments, diffused on remaining body segments; lateral line white, obscurous; legs yellowish green; rest as above.

Fourth instar: Duration : 3.00 ± 1.00 days.

Head: Width 1.27 ± 0.09 mm; similar to third instar, except black patches on vertex reduced in size, more confined near epicranial notch, epicranial sutures highly clear, creamish green in colour.

Body: Length 11.33 ± 2.30 mm. width 1.33 ± 0.27 mm; same as explained for third instar, except middorsal and lateral white bands well defined, running from cephalic to anal end.

Fifth instar: Duration : 3.00 ± 0.00 days.,

Head: Width 2.00 ± 0.00 mm; same as above, except the black patch further reduced in size.

Body: Length 18.33 ± 1.52 mm, width 2.11 ± 0.19 mm; as in fourth instar.

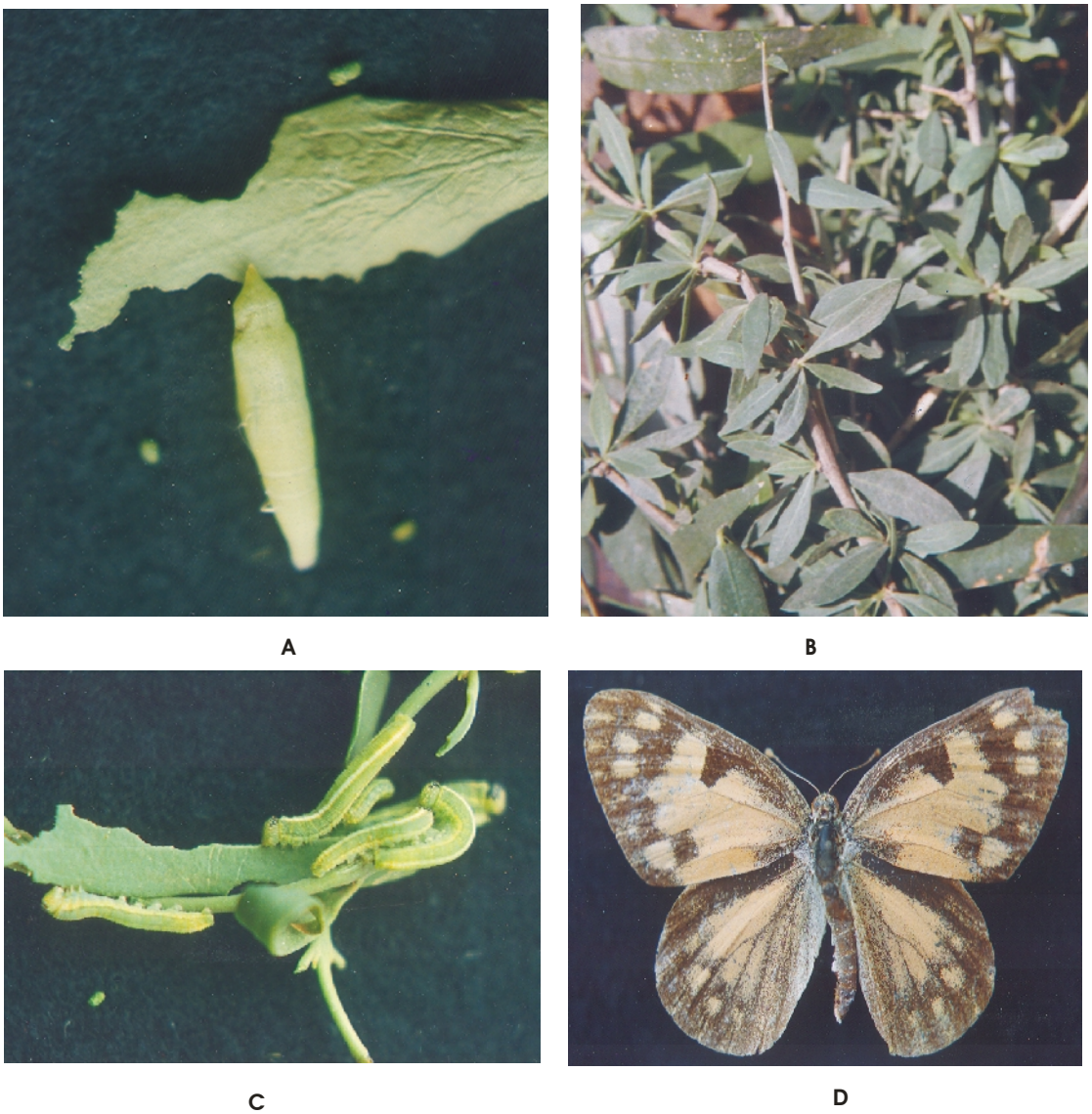

Fig. 1. Species *Colotis amata* (Fabricius). (A) Pupa (B) Larval host plant, *Salvadora oleoides* (C) Third instar larvae (D) Adult.

Pupa: Duration : 5.33 ± 0.57 days.
Length 12.50 ± 0.70 mm. width 3.50 ± 0.70 mm; newly formed pupa green in colour, turns creamish brown after sometimes, suffused with minute black spots; formed on leaf of host plant, attached to substratum by cremaster and girdle; spindle-shaped, body with ventral line forming an obtuse prominent angle nearly in the middle, at the apex of costa of the wing sheath; thorax with an inconspicuously produced on dorsal surface, otherwise flat; cephalic projection somewhat triangular; cremaster very short, dorsoventrally flattended, cremastral hooks prominent, deep brown, covering the caudal end both dorsally and ventrally.

Adult longevity: 5.00 ± 0.00 days.

Nectar food plants: *Lantana camara* Linnaeus (Verbenaceae); *Tagetus erecta* Linnaeus (Compositae).

Larval host plant: *Salvadora oleoides* Decaisne (Salvadoraceae).

OBSERVATION ON BEHAVIOUR

Oviposition behaviour: While undertaking field work, the oviposition sequences in the female of this Pierid butterfly, *Colotis amata* (Fabricius) have been recorded at two localities viz., Pakhrali and Kansal forest between 12:30 P.M to 1:15 P.M. The female begins her ovipositional activity with a typical flight in search of some young medium sized delicate leaves of the host plant. Sitting on the same side and lowering the tip of her abdomen to lay a loose clutch of 50-60 eggs on the surface of the leaf is the common practice followed by the female in this oviposition exercise. The scrutiny of the leaf on which the eggs have been laid shows that though the eggs are well apart yet very finely placed in a regular fashion. It is noteworthy to record here that unlike most other species, the eggs are mostly laid on upper surface in the centre of the young leaves by the species, under reference. The scattered egg laying on undersurface of the leaf is seldom seen. It may also be recalled that the female is so engrossed in oviposition that it hardly feels hurt even if the twig of the egg laying host is removed gently. The process of egg laying goes on normally till the whole quota is delivered/laid.

Larval behaviour: Depending on the egg shell as first food, the first instar larvae after emergence, start feeding gregariously on the foliage by keeping their cephalic ends in the same direction. Moving in a line, the larvae nibble only the upper epidermis and pallisade tissue, leaving behind the lower epidermis and vein network intact. Even after the first moulting, the larvae continue to follow the above pattern of feeding. However, approaching moulting for the second time, they start corrording all layers of the leaf and continue to do so in the subsequent instar stages. The rate of damage goes on increasing after each moult. It is only during the fifth instar stage that the group cohesion weakens and the larvae tend to disperse into smaller groups. When disturbed, the first instar shows typical dropping off behaviour by suspending itself with silken thread.

Moulting: It takes about 30-40 minutes for the larva to moult as per general procedure, given above.

Pupation: Before undergoing pupation, the colour of the larva changes to and it takes a period of about one and half hour for pupation, as procedure followed in the family Pieridae.

Eclosion: It has been seen to take place in early mornings between 7:30 A.M.

Adult behaviour: The species, under reference, is a moderate flyer and generally flies in low vegetation. It has occasionally been seen on flowers for the purpose of nectar sucking and while doing so, the adults keep the wings closed over its back. The dorsal and reflective· sun-basking behaviour has been recorded in the Pakhrali at 9:15 A.M. The adults partially open and spread their wings at a regular interval of 5-6 seconds, while sitting on the ground for sun-basking.

REFERENCES

Bell, T. R. (1909). The common butterflies of the plains of India. *J. Bombay nat. Hist. Soc.* **19**: 16-58, 438-474.

Chowdhury, S. and Soren, Rahi (2009). Rediscovery of Small Salmon Arab *Colotis amata* Fabricius (Lepidoptera: Pieridae) from saline and semi-saline areas of West Bengal, India. *Journal of Threatned taxa* **1**(6): 351-352.

Haldhar, S. M.; Bhargava, R.; Singh, R. S.; Krishna, H. and Sharma, S. K. (2015). First Report of *Colotis amata* (Lepidoptera: Pieridae) on *Salvadora persica* (Capparales: Salvadoraceae) in Rajasthan, India: Incidence and Morphometric Analysis. *Florida Entomologist* **98**(2): 442-445.

Larsen, T. B. (1988). Differing oviposition and larval feeding strategies in two *Colotis* butterflies sharing the same food plant. *Journal of the Lepidopterists' Society* **42**: 57–58.

Varshney, R.K. (1993). Index Rhopalocera Indica Part III. Genera of Butterflies from India and neighbouring countries) Lepidoptera: (A) Papilionidae, Pieridae and Danaidae). *Oriental Insects* **27**: 347-372.

Wynter-Blyth, M. A. (1957). Butterflies of the Indian region. Today and Tomorrow's Printers and Publications, New Delhi: 523 pp.