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Research Article

LIFE CYCLE OF THE COMMON BANDED AWL *HASORA CHROMUS* (CRAMER) (LEPIDOPTERA: RHOPALOCERA: HESPERIIDAE) FROM SOUTHERN ANDHRA PRADESH

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ABSTRACT
The Common Banded Awl *Hasora chromus* was univalent and seasonal. It was on wing from April to November and breeds almost with high frequency during the periods of monsoon and post monsoon seasons. Studies were conducted during April 2014 to November 2014 at different study sites in the Eastern Ghats of Southern Andhra Pradesh. The development from egg to adult was 17 - 21 days. There was no dormancy stage in the life history. Successful development of adults, larvae and pupae was 70% to 92% during the study period. Short life cycle and high success development of life stages suggest the production of 3-4 broods in the season.

Keywords: *Hasora Chromus, Life History, Instars, Univalent, Population Index, Eastern Ghats, Southern Andhra Pradesh*

The common banded Awl *Hasora chromus*
Family: Hesperidae
Sub family: Coeliadinae
Genus: *Hasora* Moore
Species: *Chromus* Cramer, 1780
Sub species: *Chromus* Cramer, 1780
Wing span: 45mm
Larval host plant: *Pongamia pinnata* (Leguminosae)

INTRODUCTION
Butterflies offer nearly inexhaustible stimulating material for those who are curious in carrying out applied and pure research (Matthews *et al.*, 1997). Butterflies the flying jewels provide economic and ecological benefits to the human society by virtue of their incontestable beauty and their ability to accomplish pollination, a key stone ecological process in natural sustainability throughout the globe (Appala *et al.*, 2010). 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 (Appala *et al.*, 2010). Butterflies thus constitute important elements in the functioning of natural ecosystems and food webs (George, 2011).
The needs for conservation of insects are increasing with each year, and the butterflies are considered to be the important flag ships for insect conservation (New *et al.*, 1995; Smetacek, 1996). The rapid, bounding flight of these butterflies are given them their name (Kehimkar, 2008). The subfamily Coeliadinae comprises of about 150 species worldwide. They are the most primitive of the skipper subfamilies. There are 8 genera - Allora from Australia; Pyrrhiades, Pyrrhochalcia and Coeliades from Africa; and the Indo-Australian genera Badamia, Choaspes and Hasora (http://www.learnaboutbutterflies.com). *Hasora chromus* is a common and very wide spread butterfly found in India, Nepal, Myanmar, Laos, Cambodia, Thailand, China, Vietnam, Japan, Malaysia, Sumatra, Borneo, Sulawesi, Java, Papua New Guinea and Australia. The genus *Hasora* consists of about 40 species distributed from India to Australia (http://www.learnaboutbutterflies.com). Most of the species are dark

brown above, and on the underside have pale bands on the hind wings, often with a purplish, bluish or greenish sheen.

The success of such efforts requires sound knowledge of the biology and ecology of butterflies, but such information was largely deficient for Indian butterflies (Gay *et al.*, 1992). We describe here the oviposting resources of adult, life cycle stages and population index (figure 5) of the Common banded Awl *Hasora chromus* (Cramer).

MATERIALS AND METHODS

Study areas were searched for the reproductive activity of the *Hasora chromus* and were found laying eggs on *Pongamia pinnata*. The leaf material along with eggs and different larval stages were brought to the laboratory and incubated and further development stages were recorded and the success rates of hatching, larval and pupal development was also recorded. Young leaves were supplied daily to the growing larvae. Searches were made every month for recording the different life stages – egg, larvae, and pupae on 50 plants of *Pongamia pinnata* to work out the population index.

Distribution (Figure 1): This butterfly normally requires a tropical to subtropical environment but sometimes ranges into sheltered, hot temperate areas. In Southern Andhra Pradesh the butterfly was encountered at Sri Lankamaleswara reserve forest, of the Eastern Ghats. The host plant, *Pongamia pinnata* have been widely recorded in the Sri Lankamalleswara reserve forest areas of Southern Andhra Pradesh and it occurs uncommonly in the tropical Southern Andhra Pradesh (Venkata *et al.*, 2014), and in the hot, humid, open grass land areas of Eastern Ghats of Southern Andhra Pradesh.

The early stages of known breeding populations of this butterfly in the reserve forest are heavily parasitised by flies and wasps, and this would suggest that these populations are relatively sedentary (Harinath *et al*., 2012).

The following species of Awls (genus *Hasora*) look similar, they are

1. Plain Banded Awl –*Hasora vita* Butter
2. White Banded Awl – *Hasora taminatus* Hubner
3. Common Awl – *Hasora Badra* Moore

Hasora chromus **Male:** Above, dark Broun and unmarked

Hasora chromus **Female:** Above, the female has two yellowish white discal spots

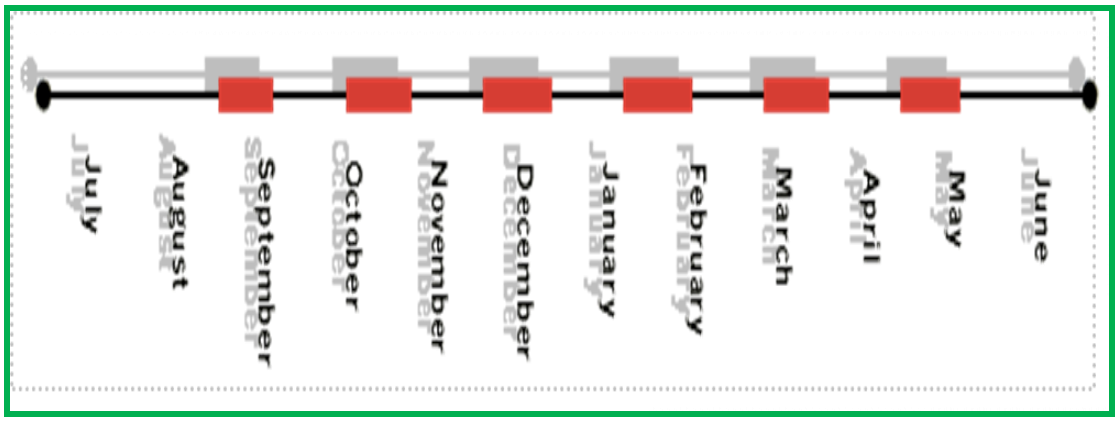

Figure 1: Flight period of *Hasora chromus* recorded in study areas

Field Observation of Butterfly Behavior

The species was uncommon in the study area (Sri Lankamalleswara reserve forest) (Figure 2) there was better change of finding larval stages of this species on its host plant *Pongamia pinnata* . The fast flying adults have been observed to visit flower for nectar. Both sexes fly mainly at dusk and dawn although they can be seen during the day time if conditions are overcast. They fly very rapidly and always keeping very close to the ground.

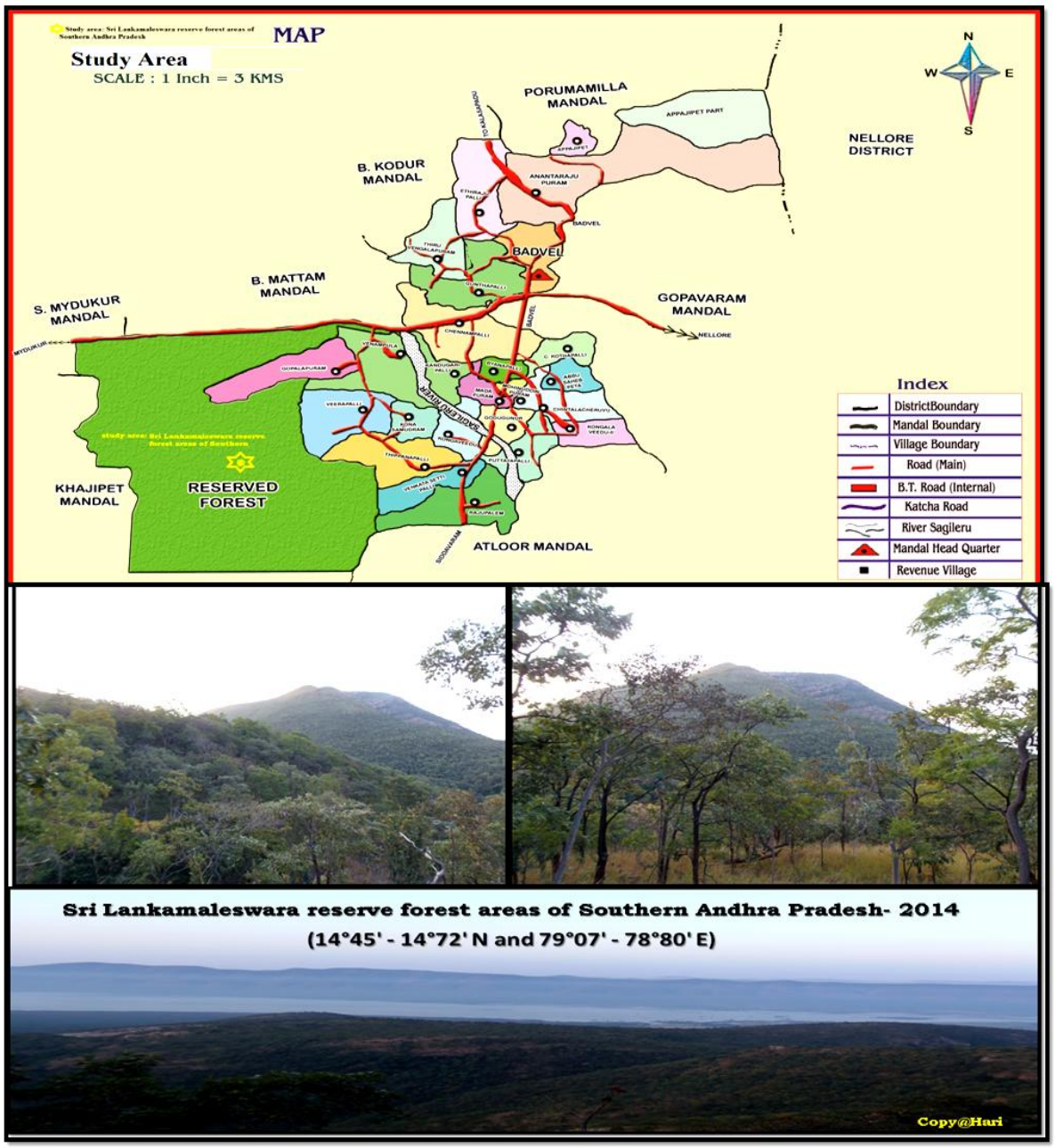

Figure 2: Study areas Map

RESULTS AND DISCUSSION

Results

Oviposition Host Plants (Figure 3)

Hasora chromus largely located in the places where damp patches, streams, rivers and food plants are abundant. Adults are found lying eggs mostly after the rainy seasons. The larvae are found in large number on food plants *Pongamia pinnata* serves both as larval host plant and adult nectar host, other host plants include *Derris* (Fabaceae), *Ricinus* (Euphorbiaceae), *Swietenia, Trichilia* (Meliaceae), *Pithecellobium* (Mimosaceae), *Murraya, Toddalia* (Rutaceae) and *Camellia* (Theaceae) according to locality and availability. It was also seen feeding on *Ricinus communis*. They feed mostly on *Pongamia pinnata* than *Ricinus communis.*

Figure 3: Larval host plant *Pongamia pinnata*

Morphology

Adult: (A & B) *Hasora chromus* was dimorphic and the wings of male are unmarked whereas female having two pale yellow cresentic spots on the hind wing. There was a prominent and narrow white to bluish white discal band partitioning the wing into an inner and an outer half. The male has a discal stigma on the forewing. They are common during monsoon and immediate post monsoon months also seen on wing form April to June.

Life History Stages (Figure 4)

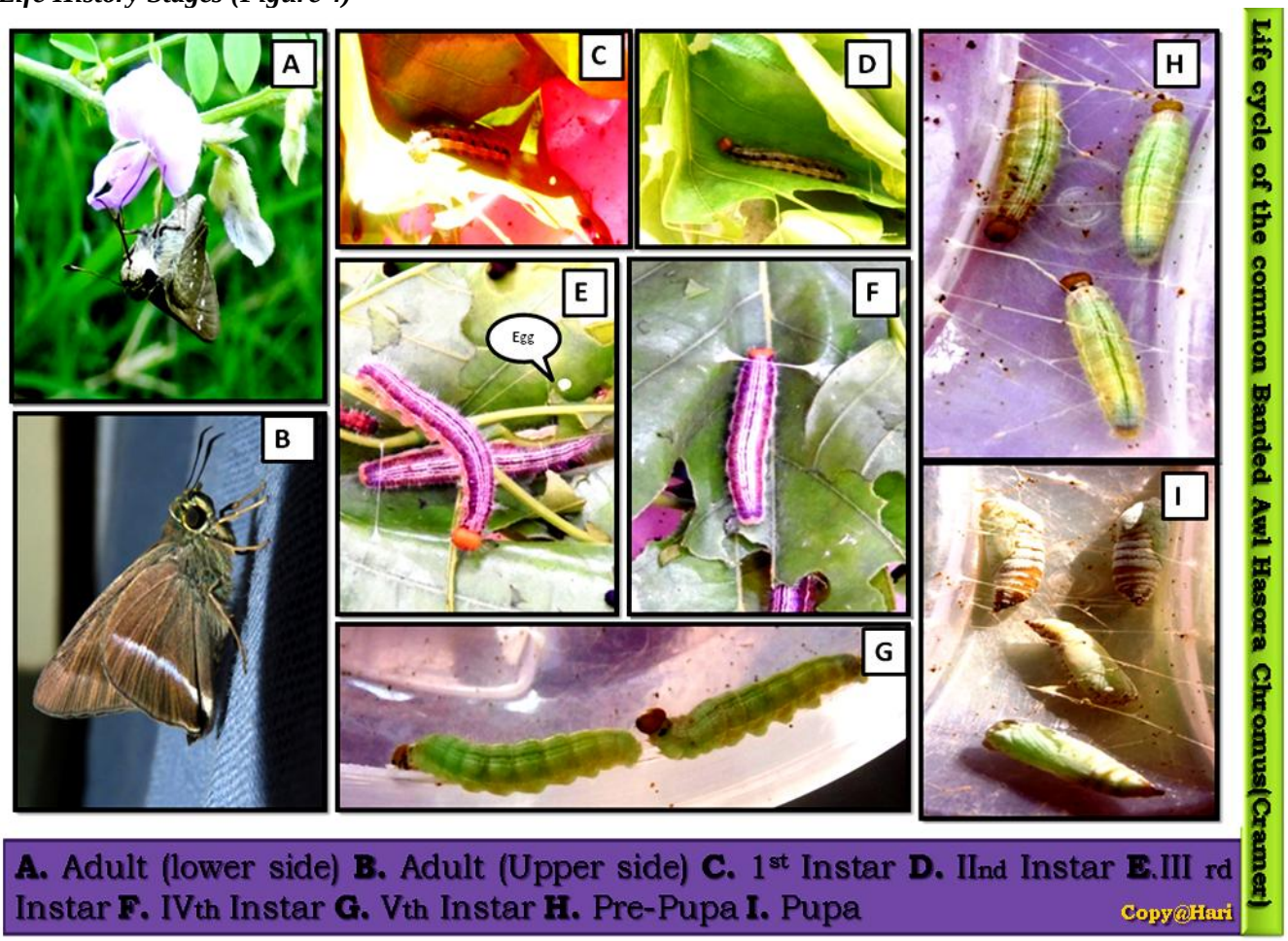

Figure 4: Life cycle of the common Banded Awl *Hasora Chromus* (Cramer)

EGGS: The eggs are laid singly or in small groups of 2-3 on young shoots. They are white and bun shaped with a flatted base. Prominent ridges are present running from pole to base. The entire egg turns pinky red as it develops and then decolorizes as the caterpillar was ready to emerge. It takes 2- 3 days for hatching.1

INSTAR I: (C) The body was typical cylindrical shape with yellowish brown body having a number of short setae. The head was large, black in colour, slightly bi-lobed and highly hairy. The dorsum of the pro thorax carries a dark colored patch. It remains for 1 to 2 days and grow to a length of 3 to 3.2 mm (3.0±.02).

INSTAR II: (D) The head capsule and body are covered with short fine setae, with four faint whitish narrow dorsal bands and one lateral band. It remains for 2 - 3 days and grows to a length of about 5.0 to 5.5 mm (5.3±0.002).

INSTAR III: (E) More prominent dorsal and lateral whitish bands are seen. Numerous tiny lighter patches dotting the dark brown surface with a narrow anal plate which was dark brown to black in colour could be seen on posterior end. This instar lasts for 2- 3 days grows to a length of 8.5 to 9.0 mm (8.7±0.005).

INSTAR IV: (F) The body turns to purple brown. The whitish setae on the head capsule are proportionately much longer than in earlier instars. This stage lasts for 2-3 days to grow to a length of 12.0 to 14.00mm (13.50±0.005).

INSTAR V: (G) The body color was changed to dark shades of black with green in colour. Several large dorso-lateral spots are also present here. Narrow lateral band could be seen. The head capsule turns to pale orange brown. It remains for 3 days and grows to a length up to 19 – 20.5mm (20 ±0.002).
PRE -PUPA: (H) The caterpillar gradually shrinks in length and decolorizes. It turns to pale greenish. During early part of this stage, the caterpillar spins large quantity of silk threads to seal the pupation shelter. It remains for 1 day and turns to pupa.
PUPA: (I) The pupa with short thorax and long abdomen, the body was green in color after a day; the body surface becomes mostly covered in a white substance and remains for 5 – 6 days to become the adult to emerge.

Population Index (Figure 5)

The numerical frequency of the natural occurrence of the life stages – eggs, larvae and pupae, on the host plants are given in figure 1. All the stages could be spotted out during April to November which correspond post monsoon in the study locality. However, there was a higher frequency of occurrence of the life stages during September to November which corresponds with the post monsoon season (Figure 5).

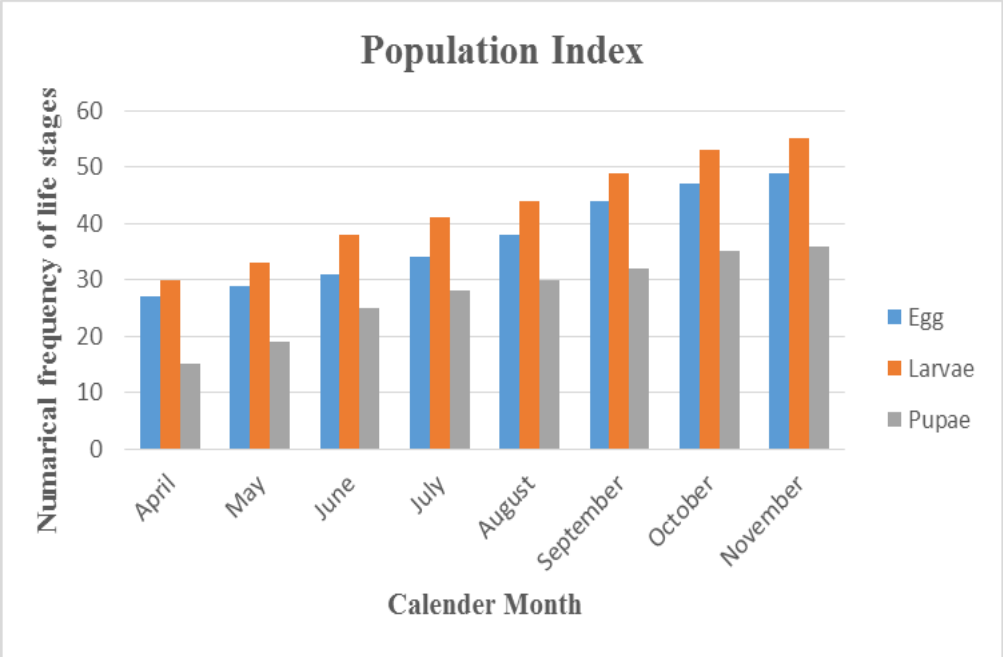

Figure 5: Population index of eggs, larvae and pupae of *Hasora chromus* based on the searches of 50 *Pongamia pinnata* plants

Conclusion

The total period of development from egg to emergence of adult was 18 - 24 days. This was a relatively short period and may enable the butterfly to have more broods yearly (Gunathilagaraj *et al.*, 1998; Kunte, 2000; Prasanna *et al.*, 2011). During this period laboratory study of hatching success rate ranged between 50 – 90% larval development success rate between 50 – 89%, pupal development success between 50 – 88%. With the three life cycle stages there was a higher success rate recorded between Septembers to November (Figure 5).

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