

THE BIOLOGY OF *RHAMMA ARRIA* IN COLOMBIA (LEPIDOPTERA: LYCAENIDAE)

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Abstract: I present and discuss the immature biology of *Rhamma arria* (Hewitson, 1870), an Andean lycaenid from Bogotá, Colombia. The foodplant is *Tibouchina semidecandra* Cogn. (Melastomataceae). Two larval color morphs are found in this species, determined by the parts of the foodplant upon which the larvae feed. The larval stage lasts 38 days from oviposition to pupation

Additional key words: Andean Region, South America, ovipositing behavior.

In this paper, I present the field and laboratory observations on the habits and biology of an Andean lycaenid butterfly, *Rhamma arria*, (Hewitson, 1870), for the first time. These include descriptions of the larval instars and pupae, with a discussion of ovipositing and larval behavior.

I discovered the food plant and ova of *Rhamma arria* through observing oviposition behavior in my garden at Bogotá, Colombia (2680 m). Four *R. arria* eggs were reared in petri dishes, each larva receiving a unique reference code for recording its development. I examined immature stages with a binocular microscope. Larvae, head capsules, egg shells and pupae were preserved in Pembel's solution, and adults in papers. The voucher specimens are in the collection of the author.

Immature stages

EGG: Diameter 0.8 mm, height 0.5 mm. Color light green, slightly flattened, covered with short, blunt spines at the intersections of an elongated quadrilateral network extending outwards from a small indented micropyle. A few spines are elongated, projecting from the egg surface. Duration: 7 days. n=4.

FIRST INSTAR LARVA: Length 2.0 mm to 3.2 mm. Head black, setose; head capsule width 0.12 mm. Thorax and abdomen initially light olive green with long setae, turning purple with a darker purple line dorsad, or remaining light green with a red-brown dorsal line, depending on foodplant substrate color. Both morphs have lighter diagonal elongated lateral marks. Larva slightly dorsally compressed with segments T2 through A8 protruding at base. Thorax segment T1 with a dark round patch dorsad and a white lateral spiracle. Abdomen with white spiracles on segments A2 through A8 with black spot dorsad on 8th and 9th segments. Duration: 6 days. n=4.

SECOND INSTAR LARVA: Length 4.0 mm. Head shiny black, face setose, head capsule width 0.30 mm. Prothoracic shield on T1 thick, rounded cephalad and extending over head, with darker spot at junction with T2; segments T2 through A8 less pubescent than first instar, thickened dorsad with darker dorsal line; on both sides of this are higher ridges forming a bisected lump dorsad on each segment. Laterally on each segment is a short diagonal dark line. Each segment protrudes laterally at base with a cluster of setae at tip and numerous shorter setae dorsad; anal shield darker. The ground color can be red or light green depending on the color morph. Spiracles as on first instar. Duration: 6 days. n=3.

THIRD INSTAR LARVA: (Fig. 4) Length 8 mm. Thorax and abdomen light green with darker green markings, or dark red with purple maculation, dorsally compressed with segments T2 through A8 protruding laterally. Head shiny black, setose; head capsule width 0.5 mm, covered by thick prothoracic shield. T1 light green or pink with short black spot dorsad at intersection with T2. T2 through A8 lighter green dorsad, darker green laterally, dark green diagonal spots on each segment, or red with darker red markings. Spiracles light brown on both morphs. Anal shield rounded with a black spot dorsad. Duration: 6 days. n=3.

FOURTH INSTAR LARVA: Length to 14.5 mm. Thorax and abdomen slightly dorsally compressed. Head shiny black, face setose; head capsule width 1.4 mm, covered dorsad by prothoracic shield. On green larvae (Fig. 5), T1 light brown dorsad with short setae and a black spot at juncture with T2; T2 through T8 light green with mottled white spots and short setae, dorsal pattern as in third instar but fainter with numerous short setae and small pink figures dorsad on each segment, spiracles black, below these a white line. On pink larvae (Fig. 6), prothoracic shield dark red dorsad, dorsal spot white; sections T2 through T8 with dark red band dorsad, light brown diagonal lines on each segment with similar white lines dorsad, A8 with dorsal dark red spot. Spiracles light brown. Two days before pupating, larva turns uniform light green or uniform dark red. Duration: 13 to 16 days. n=3.

PUPA: (Fig. 7) Length 8.8 mm; width at widest 6.0 mm. Color mottled dark brown, wing cases black ventrally, abdomen lighter brown, spiracles white, cilia around edge and dorsad on thorax. Pupa attached by a cremaster and a girdle that crosses dorsum at A1. n=2.

DISCUSSION

Food plant and oviposition behavior.

Rhamma arria inhabits the Andes from Argentina to Colombia at altitudes between 2000 and 3000 m. It is fairly widespread, but not common. Females are found more often in collections than males. (R. Robbins, pers. com.)

The food plant of *Rhamma arria* is *Tibouchina semidecandra* Cogn. (Melastomataceae), known popularly in Colombia as "siete cueros", where it is cultivated as an ornamental tree. (Fig. 3) The only other *Rhamma* to be reared to date is *Rhamma oxida* (Hewitson) on *Lupinus mutabilis* Sweet in Ecuador (Arregui-Garcia, 1985).

I observed oviposition between 1300 and 1530 on a *T.*

semidecandre tree growing in my garden in Bogotá, Colombia (2600 m) during the first week of July, 2000. The female would fly around the tree several times before landing on a flower bud, then walk over the substrate, feeling it with her abdomen before placing a single egg at the base of a bud. The only buds chosen were those beginning to open. I never observed oviposition on mature flowers nor on closed buds.

Larval Habits.

The development time for the 3 *Rhamma arria* larvae observed averaged 38 days from oviposition to pupation. The newly hatched larvae fed initially on the soft flower parts, but then one showed a preference for the base of the bud where it was able to reach the fleshy parts, despite the pubescent nature of the plant surface. This larva turned green (Fig.5), whereas those feeding on the flower parts turned pink/ red (Fig.6). This differential coloration was maintained throughout the rest of the larval development. This allowed the larvae to use crypsis to effectively divide the population into two color "species", thus possibly reducing predation by requiring avian predators to learn to identify more than one phenotype. Cryptic larval polychromatism has been observed in at least two other Neotropical theclines, *Rekoa marius* (Lucas) and *Rekoa palegon* (Cramer) in south eastern Brazil (Monteiro, 1990). My observations on *Rhamma arria* support Monteiro's results and conclusions. In both cases, the larvae were all uniform light green at eclosure, but started changing colour by the end of the first instar, in accordance with the flower parts on which they fed. The discovery of this butterfly on an introduced host plant suggests that like *Rekoa*, *Rhamma arria* is polyphagus, which, combined with polychromatism, would permit this species to exploit a wide variety of plant resources for longer periods during the year. Unlike *Rekoa*, however, I noted no myrmecophilous behavior, nor the presence of ants on the foodplant.

The larvae spent all their time on the food plant, feeding on plant tissues during both day and night. Sometimes they would tunnel into the bud, and were subsequently located only by a pile of frass beside the entrance hole. Larvae raised in the same container cohabited peacefully, sometimes sharing the same flower bud. This is in contrast to *Rhamma oxida* and the two *Rekoa* species which engaged in cannibalism. They stopped feeding only when molting, at which time they moved under a leaf or other shaded spot for about 24 hours, before resuming feeding. During the prepupal stage, the larvae left the food plant, wandering about before finally resting on another leaf or the sides of their container. This suggests that in the field the larvae leave the buds and flowers where they have been feeding in order to pupate.

ACKNOWLEDGEMENTS

I thank Dr. Robert Robbins of the National Museum of Natural History, Washington, D.C. for identification of the species and providing literature and information on distribution, and Mr. Jaime Jiménez of the National Autonomous University, Mexico, for the identification of the foodplant. Dr. Robbins and Dr. Geraldo Lamas of Lima, Peru provided helpful comments on the manuscript.

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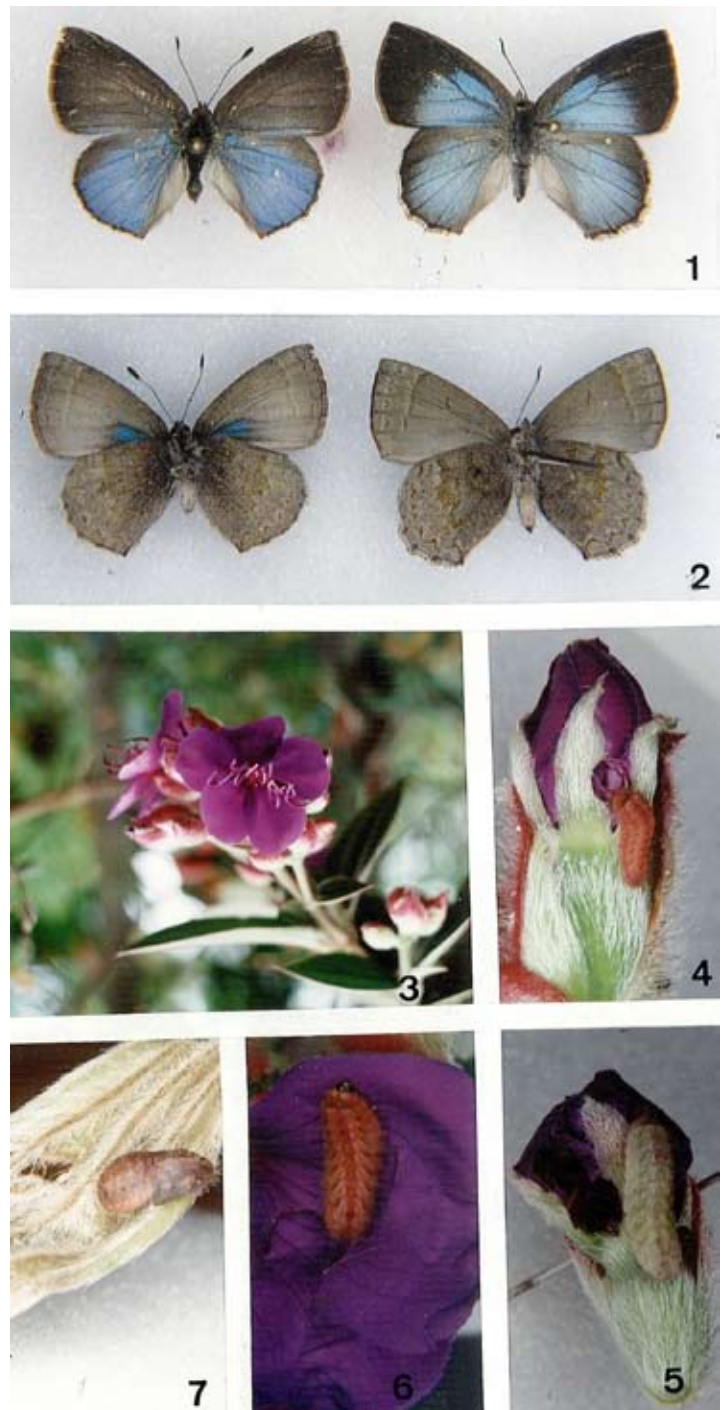


Fig. 1-7: *Rhamma arria*: 1. male (left) and female, ex larvae, dorsal view; 2. Same, ventral view; 3. Host plant; 4. Third instar larva, red morph; 5. Fifth instar larva, green morph; 6. Fifth instar larva, red morph; 7. Pupa