

# COPIOPTERYX JEHOVAH AND ITS IMMATURE STAGES (LEPIDOPTERA: SATURNIIDAE: ARSENUURINAE)

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**ABSTRACT.**— The adult and immature stages of *Copiopteryx jehovah* are described and illustrated in color. Larvae fed upon *Chrysophyllum caimito* and *Manilkara zapota* (Sapotaceae).

**RESUMÉ.**— Description et illustration en couleur, de l'oeuf à l'adulte, de *Copiopteryx jehovah*. Elevage sur *Chrysophyllum caimito* et *Manilkara zapota*.

**RESUMEN.**— Se describen e ilustran a color los adultos y los estadios inmaduros de *Copiopteryx jehovah*. Las larvas se alimentaron de *Chrysophyllum caimito* y *Manilkara zapota* (Sapotaceae).

**KEY WORDS:** Argentina, Costa Rica, Ecuador, eggs, Guatemala, hostplants, larvae, larval behavior, Mexico, Neotropical, pupae, Sapotaceae, South America.

The Neotropical genus *Copiopteryx*, occurring from southern Mexico to Argentina (Lemaire, 1980), contains 5 species of long-tailed moths with dead-leaf mimicry. Although the adult moths are spectacular and well known, little has been published about their habits and immature stages. Otero (1965) described the immature stages of *Copiopteryx sonthonnaxi* Ém. André, closely related to *C. jehovah* (Walker), but did not disclose its foodplant. Several years later, d'Araújo e Silva *et al.* (1968) listed "Massaranduba" (*Mimusops* sp., Sapotaceae) as hostplant for *C. sonthonnaxi*. Travassos (1946) published a more detailed description of the immature stages of *Copiopteryx semiramis* (Cramer), specifying *Lucuma caimito* Roem. (Sapotaceae) as the foodplant. Janzen (1984, 1985) listed *Manilkara chicle* (Pittier) Gilly (Sapotaceae) as a wild hostplant for *C. semiramis* in Costa Rica, and published (1991) a color photograph of its third instar larva. We found no information on the immature stages of *Copiopteryx jehovah*.

A short description of the adults of *C. jehovah* is as follows: wingspan of adult male (Fig. 1) about 105mm, length about 150mm; outer edge of forewing and hindwing, except long tails, crenulate; color shades of gray tinged with pink patterned with dark brown; forewing with several irregular clear fenestrae, hindwing with one. Female (Fig. 2) similar to male, but wings longer and broader, tail shorter.

#### FIELD AND REARING OBSERVATIONS

In the present study, eggs were collected by Bénéluz from a female captured at lights in French Guiana, on the road from Roura to Kaw, at 29km, on 20 Jul 1993. Larvae were reared in the laboratory, mostly by Bénéluz but also separately by Wolfe. Larvae were sleeved on *Chrysophyllum caimito* Linnaeus and several species of *Manilkara* including *M. zapota* (Linnaeus) van Royan (all Sapotaceae), where they fed for almost six weeks, completing six instars. Some larvae also accepted *Micropholis*

*guyanensis* A. de Candolle (Sapotaceae), but were subsequently moved to other species of Sapotaceae. Larvae were removed from sleeves to pots of loose soil for pupation, and emergence of adults began less than two months later.

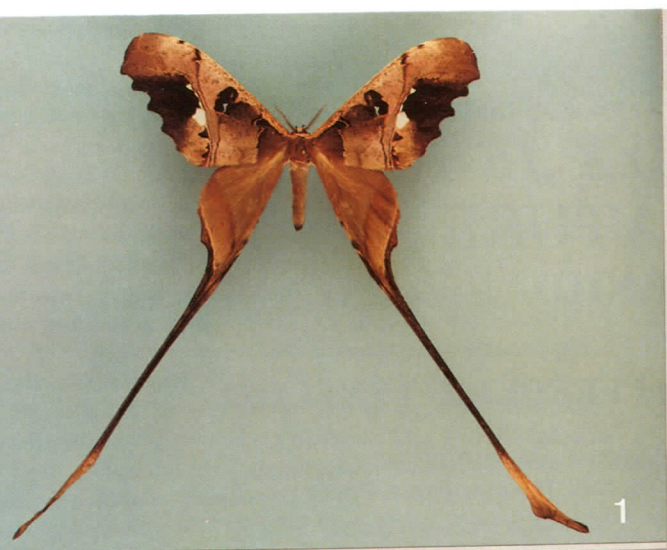
Adults emerged about 1-3 hours after dark in the laboratory. Females remained at rest and one was seen to call from 1900h (ca. 15 min. after dark in French Guiana) until dawn.

#### DESCRIPTION OF IMMATURE STAGES

Chaetotaxy and larval morphology follow Stehr (1987) and Pease (1961).

**Egg:** Egg (Fig. 3) is about 2.5mm long, 2mm wide and 1.5mm thick, and transparent. As eggs matured, developing embryo could be clearly seen inside. Eggs hatched in 8 days. Larvae did not eat chorion of eggs.

**Larva:** *First instar* (Fig. 4, 14): Head 1.2mm, shiny black; primary setae short and curved. Body: 10mm long, mottled pale yellow and green with narrow black bands on most segments. Scoli black, most apical setae flattened, rectangular, black broadly tipped white; legs and paranal lobe reddish brown. Thorax: prothoracic dorsal plate greatly thickened and bent forward, giving rise to upwardly bent and bifurcate scolus XD, bearing apical setae XD1 and XD2 at tips; the smaller bifurcate SD scolus branches outward from the base of XD, possessing apical SD1 and SD2; D1 and D2 are both present. Mesothoracic segment with scoli D1 and D2 fused at base, D1 scolus a long tapering black cone with apical seta; D2 sharp, narrow black and thornlike, arises from caudad base of D1; SD1 and SD2 fused, short, each with apical seta; single hairlike L seta and SV seta present. Metathoracic segment with ponderous bifurcate scolus 1/3 of body length, tipped with D1 and D2 setae. D2, L and SV as in T2 segment. Abdominal segments mostly with very long D1 scolus and shorter D2 scolus, each with apical seta; two L and one SV setae are simple and hairlike. Segment A8 has dorsal scoli fused into one large, bifurcate structure similar to and almost as large as dorsal scolus on T3.



3. *Copiopteryx jehovah*: 1) Adult ♂; 2) Adult ♀; 3) eggs; 4) 1st instar larva; 5) 2nd instar larva; 6) 4th instar larva; 7) 5th instar larva; 8) 6th instar larva; 9) 6th instar larva, dorsal view; 10) pupa, lateral view; 11) pupa, dorsal view; 12) pupa, ventral view; 13) typical habitat near Tena, Ecuador.

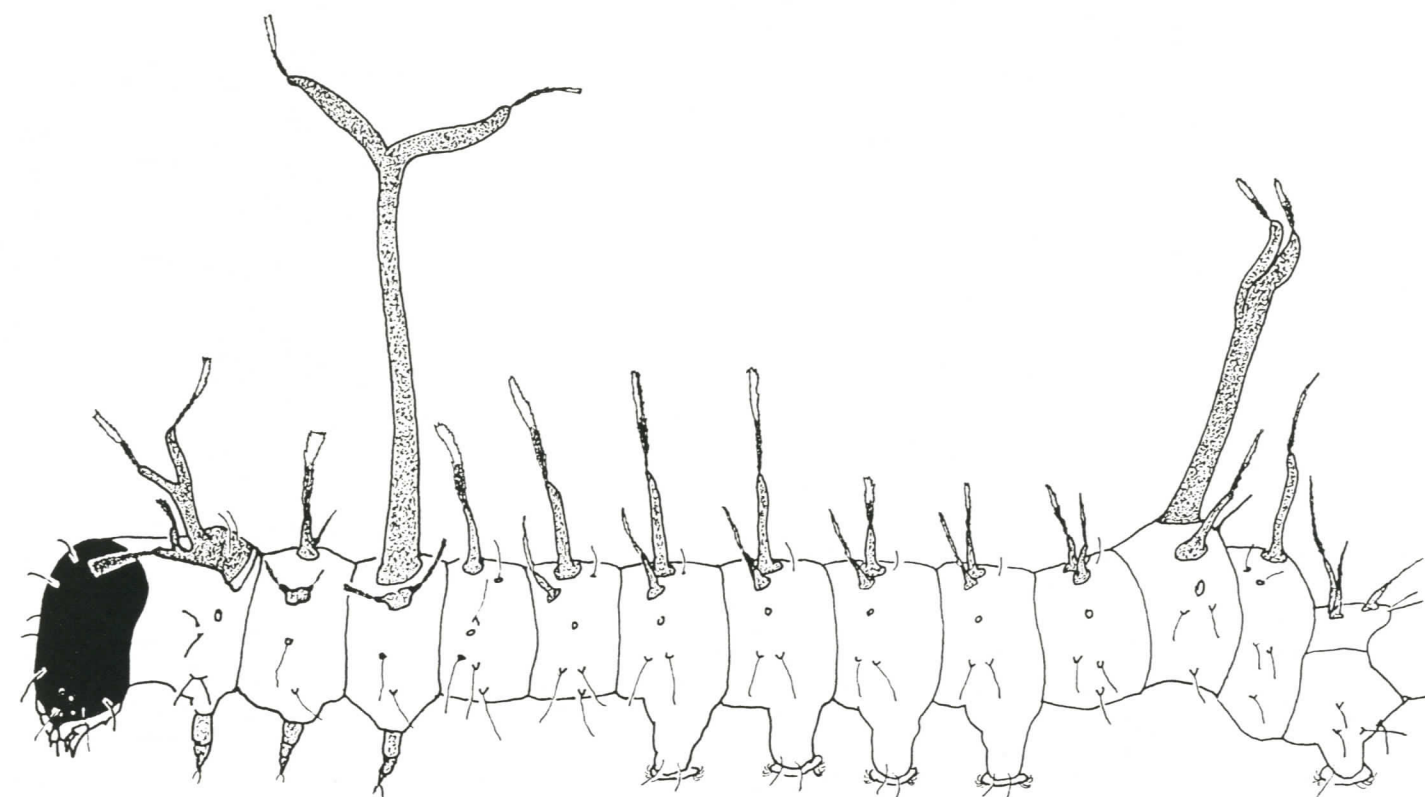


Fig. 14. *Copiopteryx jehovah*: 1st instar larva (schematic).

*Second instar* (Fig. 5): Head 1.8mm, shiny black. Body: 14mm long, green ventrally, otherwise yellow mottled green with a black saddle mostly on 3rd and 4th abdominal segments extending cephalad and caudad as narrow dark mark onto mid dorsum of adjacent segments. Scoli mostly black, reduced; dorsal scoli of 4th abdominal segment enlarged and thornlike; on prothoracic segment only small, bifurcate dorsal scoli remains; mesothoracic scoli absent; metathoracic scoli long, bifurcate, handlebar-shaped with lateral spread, black with silver band about midway; long, bifurcate, fused middorsal scoli of 8th abdominal segment also with central silver band. Thoracic and abdominal legs and paranal lobe pale greenish yellow.

*Third instar*: Head 2.4mm, brown, frons white. Body 22mm long, green with dorsal yellow mottling; integument surrounding 4th abdominal dorsal scoli is fawn-colored surrounded with black and yellow; only scoli present are dorsal, and include prothoracic, metathoracic, 8th abdominal fused and 8th abdominal thorns as in second instar, but mostly light brown except for prothoracic scoli and 4th abdominal scoli which are black, with all scoli studded with minute thorns. Thoracic legs yellow striped brown; abdominal prolegs and paranal lobe green.

*Fourth instar* (Fig. 6): Head 3.3mm, green with black borders and white frons. Body 33mm long; color and spination as in third instar.

*Fifth instar* (Fig. 7): Head 5mm, color as in fourth instar. Body: 47mm; color and spination as in fourth instar, but dorsal pattern of gray, fawn, black and yellow more intricate, with a turquoise bar between bases of metathoracic scoli; prolegs and paranal lobe as in fourth instar.

*Sixth instar* (Figs. 8, 9): Head 6.5mm, blue-green with white frons. Body: 78mm long x 15mm diameter; mostly olive green with diagonal white dorsal markings on midsection; spiracles black ringed yellow; prolegs and paranal lobe as in fifth instar; triangular lobes replace dorsal metathoracic and 8th segment fused scoli; all other scoli absent.

*Pupa* (Fig. 10-12): Color light brown, smooth.

**Host.**— Hostplants in the wild are unknown, although it is believed that *Copiopteryx* is restricted to feeding on trees belonging to the Sapotaceae. In the laboratory, larvae fed freely on species of several genera of this family (see above), and refused plants of all other families offered. It is suspected that *Copiopteryx* may feed on any species of Sapotaceae, and in French Guiana, about 60 species are represented by the genera *Chrysophyllum*, *Diploon*, *Ecclinusa*, *Manilkara*, *Micropholis*, *Pouteria*, *Pradosia*, and *Sarcaulus* (Cremers *et al.*, 1993).

**Distribution and flight period.**— According to Bénéluz (unpubl. notes), *Copiopteryx jehovah* is sympatric and synchronic with *C. semiramis* in French Guiana, both species appearing at lights together at approximately 3-month intervals throughout the year. Hours of flight activity are apparently also shared, with males of *C. jehovah* and the much more common *C. semiramis* coming to light in two waves: a first minor wave, which we believe may be composed of males in search of females, occurs at 2000h (1.25h after dark); a second, major flight occurs at 2400h. Although females rarely arrive at the lights, those that do coincide with the two male flights. The early females are worn and contain few eggs whereas the late females are new and full of eggs.

**Remarks.**— According to the observations of Bénéluz and D. Herbin (pers. comm.), although larvae of *C. jehovah* accepted and thrived on both new and mature leaves of hostplants, the larvae of *C. semiramis semiramis* (Cramer) reared in French Guiana and in France fed on tender new leaves only. Larvae refused mature leaves and died if not provided new leaves. Wolfe (unpubl. notes) successfully reared *C. semiramis banghaasi* (Draudt), from

Guatemala, on both new and mature leaves of *Manilkara zapota*, with larvae showing no preference.

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