

## Laboratory breeding of the “Living Jewels” of El Salvador, *Evenus regalis* (Cramer) and *Evenus batesii* (Hewitson) (Lepidoptera: Lycaenidae)

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The neotropical genus *Evenus* Hübner (Lycaenidae: Eumaeini) of butterflies occurs from Mexico to southern Brazil, mainly in lowland forests and contains 12 species (Robbins, 2004b). *Evenus* is characterized (Robbins, 2004a) by its unique androconial structures, their reproductive organs and because its larvae feed on plants of the family Sapotaceae which is unique within the Eumaeini tribe except for the species *Paiwarria umbratus* (Geyer) (Jørgensen, 1934, 1935 Lima, 1936; Hoffman, 1937; Schultze-Rhonhof, 1938; Zikán, 1956; Silva *et al.*, 1968; Kendall, 1975; Janzen & Hallwachs, 2012). Three species of *Evenus* occur in northern Central America: *E. regalis* (Cramer), *E. coronata* (Hewitson) and *E. batesii* (Hewitson). Only the first one is registered in El Salvador, where it was bred on Sapotaceae (Sermeño, 2009). *Evenus batesii* (Hewitson) has not been bred so far. The purpose of this document is to present the first record of breeding *E. batesii* and the first record of it in El Salvador. The immature stages of *E. batesii* versus *E. regalis* are also compared.

**Bio-ecological observations of *Evenus regalis*:** Immature stages have been found in two plant species of the family

Sapotaceae: sapote (*Pouteria sapota* (Jacq.) H. E. Moore & Stearn), and caimito (*Chrysophyllum cainito* L.) (Sermeño, 2009). The field collection and laboratory breeding of the immature stages of this species began in 2006, proving for several years that the females lay eggs in the wild in the tender shoots of host plants from May to October, observing that, depending on the quality and availability of food, adults can vary in size. The previous months coincide with the rainy season in El Salvador, but now the period of rainfall is being modified by the effects of climate change. In addition, the seasonality of some adult butterflies can also be modified by climate change. In Mexico, adults have been collected between November and January (De la Maza, 1993), while in Nicaragua, the data has been gathered during January, February, March and August (Robbins *et al.*, 2012). Sexual dimorphism was identified, with the smaller male (4.8 cm wingspan) compared to the female (5.2 cm), but the most reliable diagnostic feature is the blue coloration covering the upper face surface of the wing of the male (Fig. 1b), while in the female the blue wing area is shorter and the rest is dark (Fig. 2a). For both genders, the ventral side of the wings is colored of an

iridescent green, red, and purple with black stripes, which make them be named as “living jewels” (Fig. 1a, c and 2b). In adults, the maxillary palps are absent and labial palps are well developed. In the hindwings, the CuA2 vein projects into a long tail. Salvadoran male specimens have been found to have two long tails and two short tails (Fig. 1a-c), while in females both tails are long (Fig 2a, b).

The female lays its eggs (Fig. 2c) individually in the terminal buds or young lower leaf surface of host plants (Fig. 2 l, m). After a week, the egg hatches and the larvae begin feeding until they complete their development through different stages (Fig. 2d-h). Larvae mimic the terminal buds of host plants very well. The pre-pupa (Fig.2i), lasts two to three days to become pupa (Fig.2j) which takes between 12 to 14 days to become adult (Fig. 2k). Generally, males emerge before females. It has been observed that some pupae do not emerge when the rainy season is ending in El Salvador, which can be explained by seasonality characteristics of the species *Evenus regalis*.



Fig. 1. Male specimen of *Evenus regalis* (Cramer): a) Newly emerged male from the pupa, b) Dorsal c) Ventral. Photos: Sermeño-Chicas, J.M.

**Bio-ecological observations *Evenus batesii*:** In El Salvador, a couple of specimens have been bred in sapote plants (*Pouteria sapota* (Jacq.) HE Moore & Stearn). The immature stages are found in the buds of the host plant during September and October in El Salvador. For Mexico, it was reported the capture of adults from May to July (De la Maza, 1993).

Sexual dimorphism, with the smaller male (5.0 cm) than the female (5.2 cm) but, as in *E. regalis*, the most reliable diagnostic feature is the blue coloration which covers the entire surface of the dorsal face of the wings of male specimens (Fig. 3b), while females present a blue coloration that is reduced and the rest of the wing is dark. For both genders, the ventral face of the wings is colored green, red, and iridescent purple with white stripes, which also gives them the title of “living jewels” (Fig. 3a, c). The pre-pupa, lasts for two days, to become pupa (Fig. 3d) it takes about 12 days for an adult to emerge. In adults, the maxillary palps are absent and labial palps are well developed. In the hindwings, the CuA2 vein projects into a long tail. The species are very rare to be found on the field, being this report the first for El Salvador. To better explain the rarity of these butterflies, it has been hypothesized that parasitism keeps its population very low. There is evidence on the parasitism by wasps that kill larvae of *Evenus batesii* (Fig. 3e-g). It is also suspected that parasitism on eggs of this Salvadoran butterfly exists.



Fig. 2. Growth stages of *Evenus regalis* (Cramer): a) female dorsal, b) female ventral c) Egg; d-h) larval stages, i) Pre-pupa; j) Pupa; k) Emergence of an adult; l) host plant: Caimito (*Chrysophyllum cainito* L., m) host plant: Sapote (*Pouteria sapota* (Jacq.) H. E. Moore & Stearn). Photos Sermeño-Chicas, J.M.



a



b



c



d



e



f



g

Fig. 3. *Evenus batesii* (Hewitson): a) male newly emerged from the pupa; b) male dorsal; c) male ventral; d) Pupa; e) Larva with parasitoids; f) Parasitoid Chalcidoidea; g) parasitoid cocoons in a first stage larva. Photos: Sermeño-Chicas, J.M.

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