

DESCRIPTION OF THE EARLY STAGES OF *LEUCIDIA* (LEPIDOPTERA: PIERIDAE)

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Abstract – The host plant and the immature stages of *Leucidia brephos* and *Leucidia elvina* are described. The isolated eggs are laid under mature leaves of *Senna* spp. (Leguminosae). The larvae pass through four instars, with the last being somewhat different in the two species studied; the pupae are green, narrow and elongated, similar to those of *Phoebis* and *Eurema*. The immatures of *Leucidia* confirms the placement of this genus within the Coliadinae.

Resumo – A planta hospedeira e os estágios imaturos de *Leucidia brephos* e *Leucidia elvina* são descritos. Os ovos isolados são colocados em folhas maduras de *Senna* spp. (Leguminosae). As larvas passam por quatro estádios, com o último sendo diferente entre as duas espécies estudadas; as pupas são de cor verde e são estreitas e alongadas, muito similares àquelas de espécies de *Phoebis* e *Eurema*. Os estágios imaturos de *Leucidia* confirmam a posição deste gênero entre os Coliadinae.

Keywords – Brazil, Coliadinae, *Leucidia*, Neotropics, Pieridae

The species of Neotropical Pieridae are traditionally divided into three subfamilies (Dismorphiinae, Pierinae and Coliadinae), defined by adult and immature morphology, behavior and host-plants, and molecular characters (DeVries, 1987; Brown, 1992; Braby *et al.* 2006). However, good descriptions of the early stages are not available for several genera, including the genus *Leucidia* Doubleday, 1847. Despite the local abundance of *Leucidia* in certain places, their immature stages remain unknown, and the affinities of this genus within the Pieridae remained controversial until recently (Brown, 1992). The present paper reports the host plant and describes the immature stages of *Leucidia*, and discusses the placement of this genus within the Coliadinae.

STUDY SITES AND METHODS

Leucidia brephos (Hübner, [1809]) was studied in the Alto Juruá Extractive Reserve (REAJ), Marechal Thaumaturgo, AC (NW Brazil) on the trail to the Mato Grosso rubber estate, near the mouth of the Tejo River (8°59'S, 72°43'W), in October, 1999. The area is covered with primary rain forest with a low level of human disturbance; the observations were made along the trail inside the forest. Even if not common (less than 5 individuals observed per day in this place), adults of *Leucidia brephos* were usually observed flying near the ground in shaded places, and never in clearings, edges or open forest.

Leucidia elvina (Godart, 1819) was studied near the Research Base (23°11'S, 46°52'W) in the Serra do Japi, Jundiá, SP (SE Brazil), a mountain range (700-1300 m altitude) covered by semideciduous mesophytic forest, in Jundiá, São Paulo State, SE Brazil (Brown, 1992; Leitão-Filho, 1992).

RESULTS

Leucidia brephos

On October 2, 1999, a single female was observed flying slowly in a place where adults were usually present; the female was "tapping" with her forelegs several small plants (5-10 cm high) in a small area (5 m radius), a behavior typical of ovipositing females of many species of butterflies. The female showed a marked preference for a very small plant species with compound leaves, with five individuals growing in the area. Several times

the female landed on the leaves of one of these plants, curling the abdomen as if attempting to oviposit, but no eggs were laid. The female continued in this behavior from 1230 hs to 1400 hs, when a single egg was laid on the underside of a mature leaflet of an individual of this plant species (later identified as a species of *Senna* (Leguminosae) having paripinnate leaves with four leaflets). The whole plant was collected and kept to rear the larva.

The egg was entirely white, elongate and with several inconspicuous longitudinal ridges. The larva hatched after four days, and fed on the same leaflet where the egg was placed. The larva started to feed near the midvein of the leaflet, producing small square holes between the leaf veins, and consumed all leaf tissue except the midvein in the later instars; this single plant (8 cm high and with three leaves) was enough to feed the larva until pupation. The larva passed through four instars; the first to third instars were completely green with a transparent smooth head capsule. The larvae reached 14 mm in length in the fourth instar, when a pattern appeared of oblique pale green lateral streaks, extending dorso-posteriorly. The first instar rested along the midvein of the leaflet, and the remaining instars rested on the stem of the plant. The fully grown larva (prepupa) lost the lateral pattern and attached itself to the stem, with head pointing down (Fig. 1A); the larva formed a silk belt, and pupation occurred after one day, giving a total of 15 days from egg to pupa. The pupa (Fig. 1B, C) was 9 mm long, wholly green, with some dark markings on the wing caps, flattened laterally, with rounded projecting wing caps and with a long pointed process in the frontal region. The butterfly (a male) eclosed 10 days after pupation.

Leucidia elvina

The host plant was discovered in the same way as that described above, on January 31, 2000, and was also a species of *Senna* (Leguminosae) with paripinnate leaves (with four long leaflets). The eggs were collected on small seedlings (still with cotyledon leaves) that were also the plants most tapped by females. Two eggs were collected, one on the upperside and another on the underside of mature leaflets. The plants were collected and brought into the laboratory to rear the larvae.

EGG (FIG. 2): 1.2 mm high, 0.3 mm wide; white, elongated, with several (16-18) weakly marked longitudinal ridges and 30-35 transverse ridges.

LARVA:

First instar: Head: 0.5 mm wide; pale green, due to the translucent head capsule, with long black hairs in the frontal region; horns and spines absent as in all instars. Body: pale green; legs, prolegs and anal plate light green as in all instars. Maximum length 3.0 mm. Duration 5 days.

Second to fourth instars (Figs. 1 D,E): Head: 0.68 mm wide in second, 0.96 mm in third instar and 1.24 mm in fourth instar; green, due to the translucent head capsule. Body: wholly green; a light lateral stripe defining a creamy green dorsal region appears in fourth instar. Maximum length, 6 mm in second instar, 10 mm in third instar and 15 mm in fourth instar. Duration 2 days in second instar, 3 days in third instar and 4 days in fourth instar.

PUPA: 10 mm long; wholly green; profile elongated and flattened laterally; wing cases rounded and projecting ventrally; ocular caps forming a pointed projection; abdominal segments mobile. Essentially identical to that of *L. brephos*, but without the black marks. Duration 8 days.

DISCUSSION

The affinities of *Leucidia* remained uncertain for many years, especially due to the lack of information on the host plant and early stages. Brown (1992) tentatively placed *Leucidia* within the Pierinae, and Lamas (2004) treated this genus as a Coliadinae. Recently, a broad molecular study confirmed the placement of *Leucidia* as a Coliadinae (Braby *et al.*, 2006). Additionally, both the host plants (Brassicaceae, Cruciferae, Capparidaceae and Loranthaceae) and immatures of Pierinae (DeVries, 1987; Brown, 1992) are very different of those of *Leucidia*. The immatures of many species of Pierinae are gregarious, and the pupae are not elongated and flattened, but often bear several appendages on the

head, thorax and abdomen regions, a pattern very different from that observed on *Leucidia*.

The early stages and host plant of *Leucidia* are very similar to those of most *Eurema* and *Phoebis* (see D'Almeida, 1922; DeVries, 1987; Brown, 1992), with solitary eggs and larvae and the elongated flattened pupae. The present data confirm the placement of this genus within the Coliadinae.

ACKNOWLEDGEMENTS

I thank K. S. Brown Jr. and Ronaldo B. Francini for helping in field work and for useful criticisms and comments on the manuscript. Financial support for fieldwork in Acre was provided by the Brazilian CNPq and by grants from the BSP and CIFOR; the ASAREAJ provided logistic support during fieldwork in Acre. The "Prefeitura Municipal de Jundiaí" allowed field work in the "Serra do Japi". I also thank FAPESP (grants 00/01484-1 and 04/05269-9 and the BIOTA-FAPESP program - 98/05101-8), the Brazilian CNPq (fellowship 300315/2005-8) and the National Science Foundation (grant DEB-0527441).

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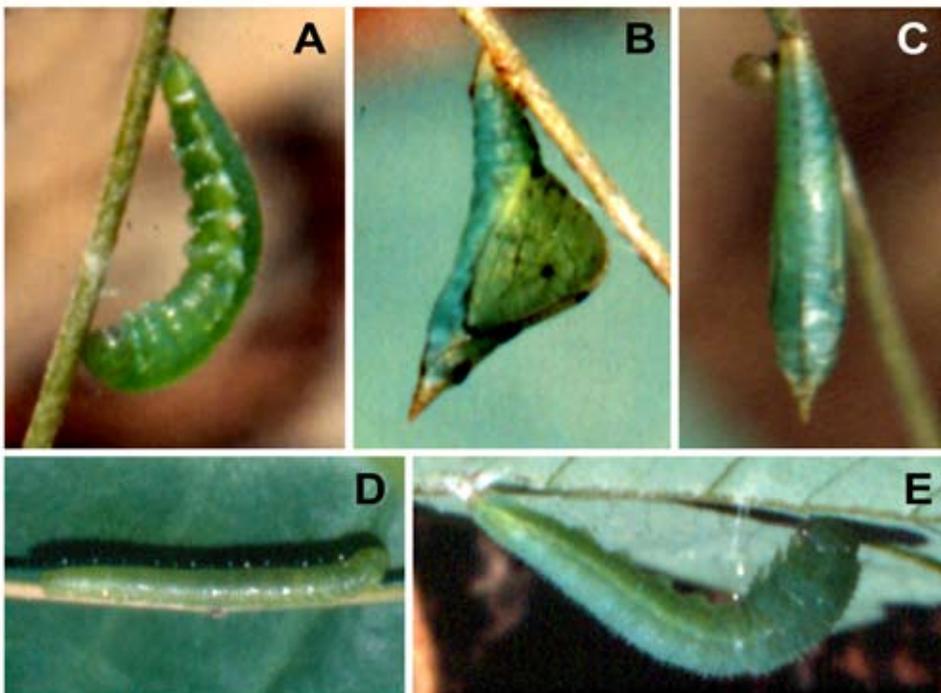


Fig. 1 – Immature stages of *Leucidia*: A-C, *Leucidia brephos* from REAJ; A, fourth (last) instar; B,C, pupa; B, lateral view; C, dorsal view; D-E *Leucidia elvina* from Serra do Japi; D third instar; E, fourth (last) instar.