

IMMATURE STAGES OF *NAPEOGENES SULPHURINA* BATES, 1862 (NYMPHALIDAE, ITHOMIINAE) FROM NORTHEASTERN BRAZIL

Additional key words: Alagoas, life cycle, Lycianthes, Napeogenini, Solanaceae.

Although the immatures of Ithomiinae have been described for representatives of most genera (DeVries 1987, Brown & Freitas 1994 and references therein), little information is available for many basal groups and highly diversified genera (Freitas & Brown 2002). The tribe Napeogenini includes the genera *Hypothyris* (16 species), *Napeogenes* (23) and *Hyalyris* (12), plus the monotypic *Epityches*, *Aremfoxia*, *Garsauritis* and *Rhodussa* (Lamas 2004 as modified by Willmott & Freitas in prep.). Immatures have been described for species in all Napeogenini genera except *Aremfoxia* (Brown 1980, Brown & Freitas 1994), but additional information about species in the large genera is still needed. In the largest genus of this tribe, *Napeogenes*, immatures of only three species have been described (Brown & Freitas 1994:14, including partial information for *N. sulphurina* in Table 1). The present paper describes in details the immature stages of *Napeogenes sulphurina* Bates, 1862 (Nymphalidae, Ithomiinae), and compares their morphological characters with those of other known Napeogenini.

Adults and immatures of *Napeogenes sulphurina* were collected near Usina Serra Grande, Ibataguara, Alagoas, about 70 km from the Atlantic coast (08°58'S, 36°03'W) and about 500 m above sea level. This region contains many fragments of dense lower montane rain forest. The mean annual temperature is 24°C, and the annual rainfall has been near 3000 mm in some recent years (M. Tabarelli, pers. comm.). Most observations were made in the Coimbra forest fragment (3400 ha), from 3 to 5 August, 2003, in the Sede region, Cavalo Morto Road, Varjão and Road to Petrópolis. Immatures and host plant were found in the forests near the Road to Petrópolis (09°00'S, 35°53'W), where a large Ithomiinae "pocket" was present. Additional specimens used for descriptions were collected by KSB in Ipojuca, Pernambuco (about 120 km NE from Usina Serra Grande), in 1970 (see Table 1 in Brown & Freitas 1994). Data were recorded on behavior and development times for all stages, and dry head capsules and pupal castings were kept in small glass vials. When there was sufficient material, immatures were fixed in Kahle solution (AVLF collection). All measurements were made using a microscope fitted with a calibrated micrometric ocular. Egg size is presented as height and diameter of field-collected eggs, and head capsule size is the distance between the most external stemmata (as in

Freitas 1991).

DESCRIPTION OF EARLY STAGES

Egg (Fig. 1a,b). White, spherical, with 14–15 longitudinal ridges and 8–9 transverse ridges; height and diameter 0.7 mm. Duration 4–5 days, $n = 4$.

Larvae: first instar (Figure 1c,d). Body white, turning green after first meal; legs, prolegs and anal plate without pigmentation. Head light yellow; average width 0.43 mm (SD = 0.012, $n = 4$). Maximum length 2 mm. Duration 2–3 days, $n = 2$.

Second instar. Similar to previous instar except for the following characters. Head yellow; average width 0.57 mm (SD = 0.009, $n = 4$). Maximum length 3.5 mm. Duration 2–3 days, $n = 4$.

Third instar. Similar to previous instar except for the following characters. Body light green; conspicuous sublateral semicircular tubercles; a lateral yellow mark in A1 and a pair of yellow lateral protuberances in A8. Head cream with a frontal transverse black band; average width 0.85 mm (SD = 0.035, $n = 4$). Maximum length 7 mm. Duration 3–4 days, $n = 4$.

Fourth instar (Fig. 1e). Similar to previous instar except for the following characters. Body dark gray; legs black; lateral yellow stripe broad and including sublateral tubercles and spiracles. Average head width 1.23 mm (SD = 0.039, $n = 6$). Maximum length 10 mm. Duration 2–4 days, $n = 4$.

Fifth instar (Fig. 1f,g). Body dark greenish gray; legs black; prolegs with lateral black plates; conspicuous sublateral semicircular tubercles; anal plate same color as the rest of the body (without black); a lateral dark yellow mark in A1 and a pair of dark yellow protuberances in A8; lateral yellow stripe broad and including sublateral tubercles and spiracles. Head cream with a frontal transverse black band; average width 1.82 mm (SD = 0.059, $n = 5$). Maximum length 17 mm. Duration 5 days, $n = 3$.

Pupa (Fig. 1, h-i). Short, slightly bent, beige after pupation, with many brown markings on the abdomen and wing cases; becoming entirely reflective after two days; cremaster dark red; ocular caps short and pointed. Length 9 mm ($n = 2$). Duration 8–9 days ($n = 2$).

HOST PLANTS OVIPOSITION, AND IMMATURE BEHAVIORS

Adults (Fig. 1j) were common in most of the habitats in the study area, including primary and secondary forests, visiting flowers early in the morning on forest edges. Adults were observed feeding on flowers of Asteraceae, and also on bird droppings inside the forest. Adults were especially abundant (more than 200 adults in an area of about 200 m²) together with their commimics *Scada reckia* (abundant) and *S. karschina delicata* (rare, local) in a large ithomiine pocket near the Road to Petrópolis, the place where the host plant was found. The host plant is a small scandent vine in the genus *Lycianthes* (Solanaceae), very similar to that used by this species in Ipojuca (Drummond & Brown 1987: 350). Ovipositions were not observed, but all eggs found ($n = 10$) were laid singly under leaves. After hatching, caterpillars first ate part of the egg shell, and then began to eat the leaves by chewing small holes in

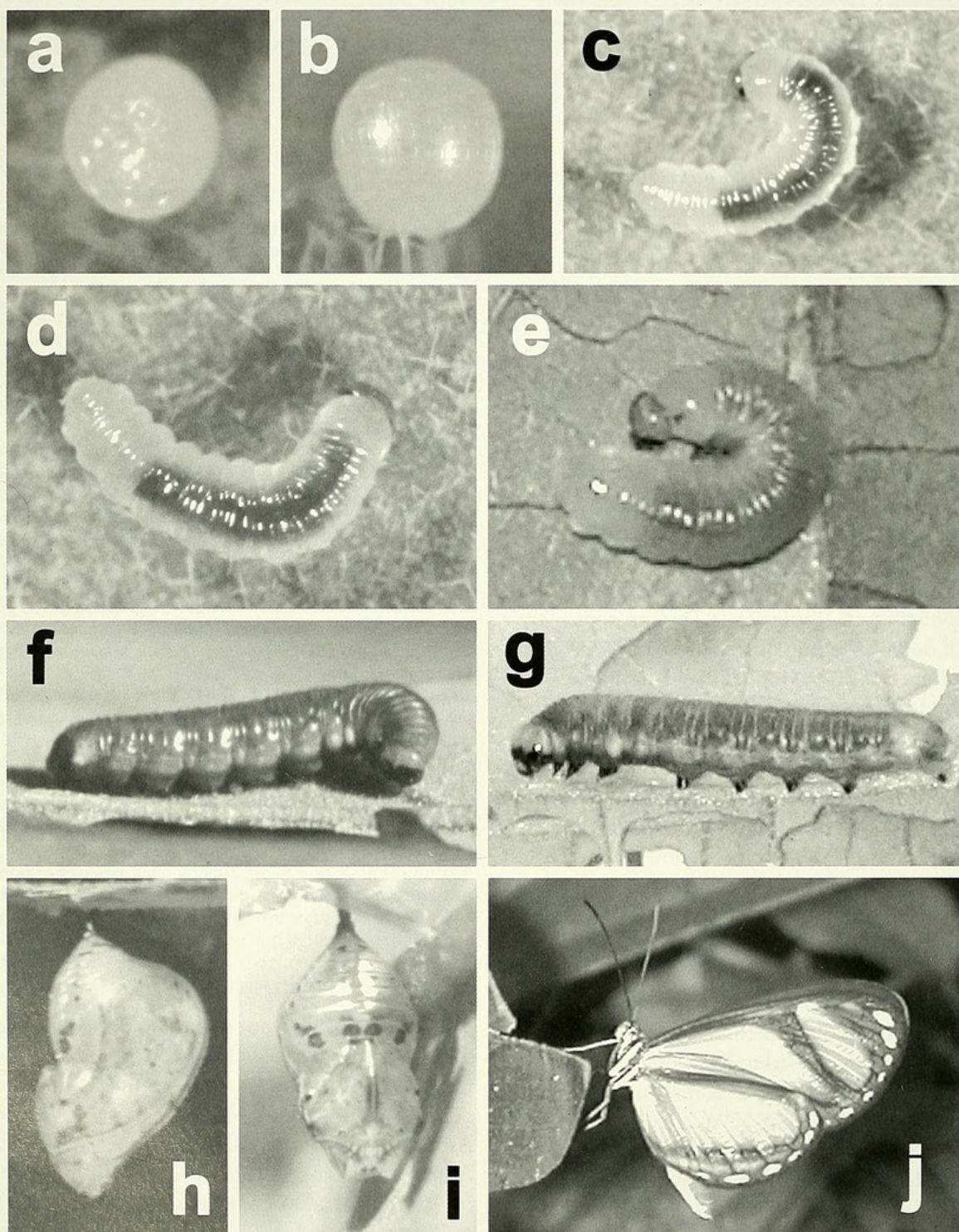


FIG. 1 - Immature stages of *Napeogenes sulphurina*; a,b, egg; c, first instar; d, second instar; e, fourth instar; f,g, fifth (last) instar; h,i, pupa (h, lateral; i, dorsal); j, adult male.

the blade. Larvae were not cannibalistic, and rested in a J-shaped position on the underside of the leaves; when disturbed, they dropped off the leaf suspended by a silk thread.

The immatures of *N. sulphurina* are very similar to those of other Napeogenini species (D'Almeida 1938, Brown 1980, Brown & Freitas 1994: 14), including the presence of sublateral semicircular tubercles and a lateral stripe in the 4th and last instar larvae, and the shape and color of the pupa (except for *Epityches*, which has a green pupa similar to those of the Dircennini and Godyridini; Brown & Freitas 1994). Prolegs with lateral black plates (a feature most common in species belonging to the basal tribes of Ithomiinae such as Tithoreini and Melinaeini) are known in *Napeogenes* and *Rhodussa*, but are absent in *Garsauritis* and all known immatures of *Hypothyris* and *Hyaliris*. The frontal transverse black band on the head capsule, shared with most known *Ithomia* (Brown & Freitas 1994:14, Srygley & Penz 2000), is known only in the genus *Napeogenes* within the Napeogenini (*N. sylphis*, *N. inachia*, Brown & Freitas 1994:14, and *N. apulia* [unpublished data, K. R. Willmott]); additional information about other species of *Napeogenes* is needed to confirm this pattern.

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NOTES ON THE LIFE HISTORY OF *DYNASTOR DARIUS DARIUS* (FABRICIUS) (NYMPHALIDAE: BRASSOLINAE) FROM VENEZUELA

Additional key words: Biology, development, host plants, immature stages

Three *Dynastor* species are known to occur in South America (Urich & Emmel 1991a, 1991b). *Dynastor darius* (Fabricius), is a common, though usually not abundant, fast-flying, crepuscular butterfly, active at dawn as well as dusk. It has been reported from Brazil to Guatemala, including Trinidad (Aiello & Silberglied 1978, Urich & Emmel 1991b). Two subspecies are commonly recognized: *darius* from Mexico to the Amazon basin, and *stygianus* (Butler) from Guatemala to Ecuador (De Vries 1987). In Venezuela, subspecies *darius* inhabits semi-deciduous forests between 100 and 1000m.

This butterfly has been reported as a minor pest of pineapple crops (*Ananas comosus* (L.) Merr., Bromeliaceae) (Araque 1961, Petty et al. 2002). Host

records include also different Bromeliads in the genera *Aechmea*, *Billbergia*, *Bromelia*, *Ortgiesia* and *Tillandsia* (De Vries 1987, Penz et al. 1999). In natural conditions, adults rest on soil where they are well camouflaged among dry leaves. However, we have seen some quietly resting on plant trunks close to the ground. M. Cock (personal communication) was able to easily catch a specimen that was resting on a thin palm trunk. Though it has been reported that the adults of *D. d. stygianus* and *D. d. darius* do not visit rotting fruit or other sources of nutrition (DeVries 1987, Urich & Emmel 1991b), we have seen them occasionally feeding on rotten mangoes (*Mangifera indica* L. Anacardiaceae) at dusk in at least two Venezuelan localities (Palmichal, Carabobo and Choroní, Aragua).



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