

SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

Immature Stages of the Butterfly *Magneuptychia libye* (L.) (Lepidoptera: Nymphalidae, Satyrinae)LUCAS A. KAMINSKI¹ AND ANDRÉ V.L. FREITAS²¹Curso de Pós Graduação em Ecologia, lucaskaminski@yahoo.com.br; ²baku@unicamp.br
Depto. Zoologia, Instituto de Biologia, Univ. Estadual de Campinas, C. postal 6109, 13083970, Campinas, SP*Neotropical Entomology* 37(2):169-172 (2008)Estágios Imaturos da Borboleta *Magneuptychia libye* (L.) (Lepidoptera: Nymphalidae, Satyrinae)RESUMO - Os estágios imaturos da borboleta *Magneuptychia libye* (L.) são descritos, e sua morfologia é comparada com a de outros Satyrinae Neotropicais.

PALAVRAS-CHAVE: Euptychiina, Poaceae, ciclo de vida

ABSTRACT - The immature stages of the butterfly *Magneuptychia libye* (L.) are described, and their morphology is compared with other Neotropical Satyrinae.

KEY WORDS: Euptychiina, Poaceae, life history

Even though recent efforts to make available new information on life cycles of Neotropical Satyrinae (Murray 2001, 2003; Freitas & Peña 2006), there is a general lack of information about the immatures of species belonging to this subfamily (see Freitas 2002, 2004a, 2007).

Because immatures are increasingly important to our understanding of butterfly systematics (Freitas & Brown 2004, Willmott & Freitas 2006), descriptions of early stages of any Satyrinae species can help give us a better picture of the full morphological diversity in this subfamily. The present paper describes the immature stages of *Magneuptychia libye* (L.), a species of Satyrinae common in most Neotropical forests.

Material and Methods

Adults and immatures of *M. libye* were studied in the field at two localities in Acre, Brazil: Reserva Extrativista do Alto Juruá, Alto Rio Juruá, Marechal Thaumaturgo (09°24'S, 72°42'W) (September 1999) and Serra do Divisor, Mâncio Lima, State of Acre (07°54'S, 73°35'W) (September 2006). The immatures (eggs and larvae) were collected in the field, and eggs were also obtained from fertile females confined in plastic bags with host plant leaves (as described in Freitas 2002, 2004a, b). The larvae were reared in plastic containers that were cleaned daily, and were provided with fresh plant material every two or three days (following Freitas 2002). Data were taken on behavior and development times for all stages, and head capsules and pupal exuviae were preserved. When there was sufficient material, immatures were fixed in Kahle. All samples from immatures (preserved eggs and larvae, head capsules and pupal exuviae) and adults are deposited at the Museu de História Natural (Unicamp) (AVLF leg.).

Results

In the field, *M. libye* was observed ovipositing on an unidentified species of small-leaved species of grass (data from Mâncio Lima), and larvae were collected on two different species of unidentified grasses in Marechal Thaumaturgo. Oviposition was observed at 4 pm, and a total of four eggs were laid, two in each leaf. Females from Marechal Thaumaturgo oviposited readily in plastic bags even without host plant leaves. In the laboratory, larvae accepted the Carpetgrass *Axonopus compressus* (Sw.) P. Beauv. (Poaceae) (grama missioneira), a species of very similar appearance to one of their native host plants in Marechal Thaumaturgo. The newly eclosed larvae ate a large part of the chorion before starting to eat the leaves. Larvae of all instars were not very active, moving slowly and changing place only to search for new leaves.

Description of early stages. Immatures reared from the three sites were very similar, and passed through five instars. The egg descriptions and measurements are based on material from Marechal Thaumaturgo; the larval and pupal descriptions and measurements are based on material from Mâncio Lima.

Egg. Spherical, white, without visible ridges or texture under the optic microscope. Height 1.0-1.1 mm; diameter 1.1-1.2 mm (n = 9). Duration 4-5 days.

First instar. (Fig. 1a). Head capsule width 0.62-0.68 mm; scoli 0.12-0.16 mm (n = 4). Head black, with enlarged chalazae, and with a pair of short scoli on vertex, each with two long slender setae ending in fine points. Third stemma

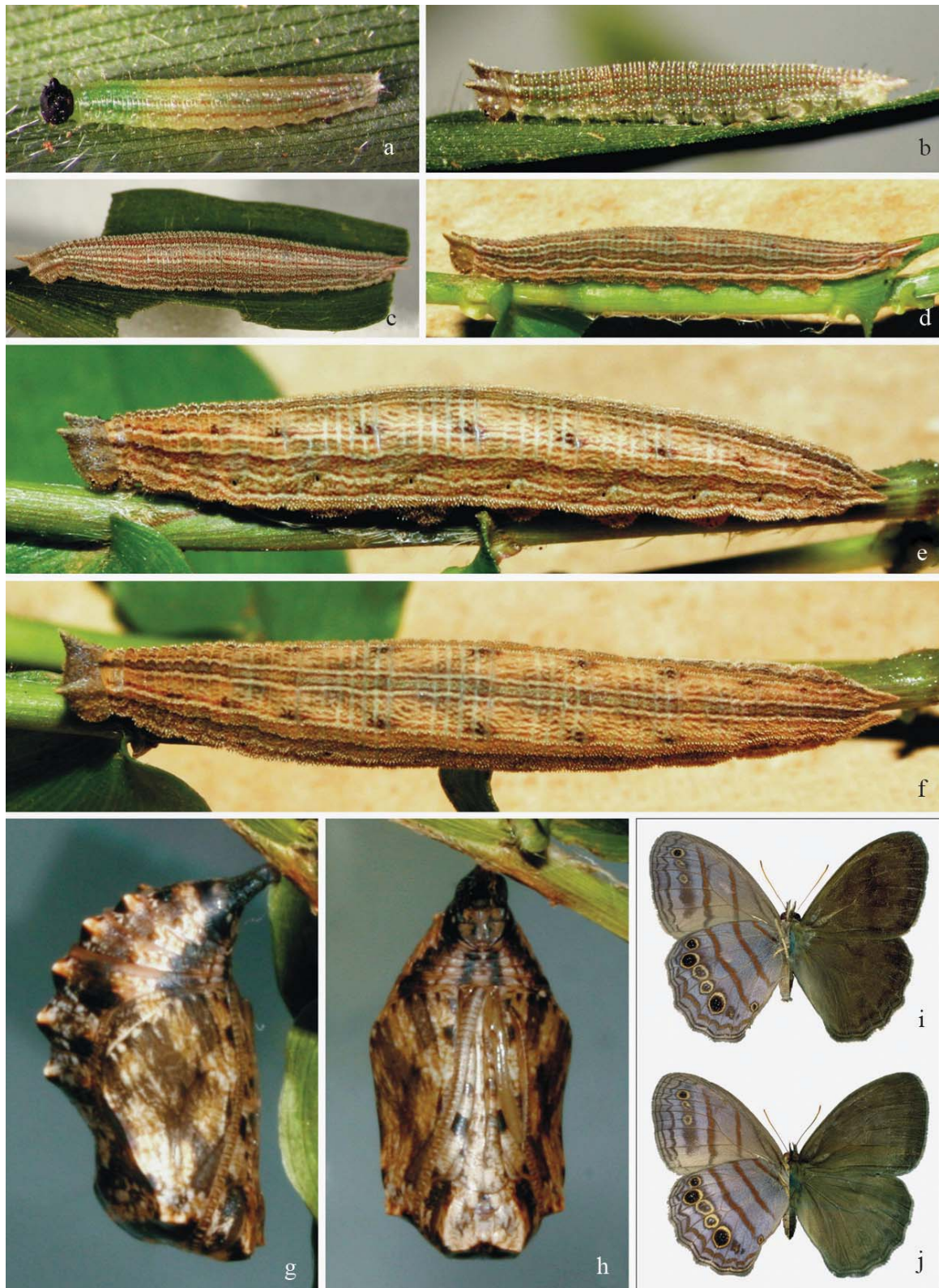


Fig. 1. Life stages of *Magneptychia libye* (from Mâncio Lima, AC). a, first instar; b, second instar; c, third instar; d, fourth instar; e, fifth (last) instar, lateral view; f, fifth (last) instar, dorsal view; g, pupa lateral view; h, pupa ventral view; i, adult male; j, adult female (ventral left, dorsal right).

larger than the others. Body beige, green after feeding, smooth, with longitudinal red stripes; caudal filaments very short. Setae elongated and transparent. Maximum length 4.5 mm. Duration six days.

Second instar. (Fig. 1b). Head capsule width 0.9 mm; scoli 0.3-0.38 mm (n = 4). Head beige with dark brown areas and two short, diverging scoli on vertex. Body greenish beige, striped longitudinally with thin reddish lines; caudal filaments short. Maximum length 7.5 mm. Duration seven days.

Third instar. (Fig. 1c). Head capsule width 1.26-1.3 mm; scoli 0.46-0.52 mm (n = 4). Head beige with brown lines; two diverging scoli on vertex. Body beige with many longitudinal red stripes; caudal filaments short. Maximum length 15 mm. Duration six days.

Fourth instar. (Fig. 1d). Head capsule width 1.88-1.9 mm; scoli 0.68-0.72 mm (n = 4). Very similar to third instar. Maximum length 20 mm. Duration eight days.

Fifth (last) instar. (Fig. 1e, f). Head capsule width 2.77-2.93 mm; scoli 0.99-1.11 mm (n = 4). Head beige, with two diverging pointed scoli on vertex. Body beige with many longitudinal brown stripes and a subdorsal blotch on each of nine segments; middorsal and lateral stripes conspicuously dark; ventral region dark brown; legs and prolegs light brown; caudal filaments short. Maximum length 35 mm. Duration 14 days.

Pupa. (Fig. 1g, h). Very short and smooth; mostly dark brown, mottled with black (with color pattern variation among individuals), with short squared ocular caps; cremaster dark on ventral portion; abdomen with a series of five pairs of short subdorsal protuberances. Total length 13-14 mm (n = 3). Duration 14 days.

Adults. (Fig. 1i, j). Material reared from Mâncio Lima yielded the two adults figured, one male and one female. Material from Marechal Thaumaturgo produced two males and two females.

Discussion

The satyrine *M. libye* is a common and widespread species of the Euptychiina, occurring from Central America to the northern Atlantic Forest, passing through the Andes and most of Amazonia (DeVries 1987, Brown & Freitas 2000). Compared with most species of Neotropical satyrines, *M. libye* is relatively well known, including host plant use, oviposition pattern, and a few brief reports of population biology (Mackay & Singer 1982, Singer & Mandracchia 1982, Whittaker 1983, DeVries 1987). The immatures of this species, however, were never described in detail, and only superficial textual descriptions have been available until now (DeVries 1987).

The general appearance of *M. libye* immatures is similar to that of some species of the "*Cissia*" group as described

by DeVries (1987) and Singer *et al.* (1983). The larvae strongly resemble those of *Cissia labe* (Butler) and *Cissia penelope* (Fabricius) (Singer *et al.* 1983), but with longer head horns. The pupae, stubby and with short pyramidal dorso-abdominal protuberances are very similar to those of *Cissia confusa* (Staudinger) and *C. pseudoconfusa* Singer, DeVries & Ehrlich (Singer *et al.* 1983).

Recent studies showed that the genus *Magneuptychia* Forster, as currently defined, is not monophyletic (Murray & Prowell 2005). A major redefinition of this genus and many other satyrine genera will be needed (Freitas 2003, 2004a, 2007), and data from immatures could be an important component of these future studies.

Acknowledgments

The authors would like to thank Keith S. Brown Jr. for help in field work and for reading the manuscript. Marcus Liesenfeld and Hosana Piccardi helped in field work in Mâncio Lima. We thank Gerardo Lamas for confirming species identification. The ASAREAJ provided logistic support during fieldwork in Marechal Thaumaturgo, Acre. IBAMA provided field permits for the authors. This paper was supported by FAPESP grants 00/01484-1 and 04/05269-9 and the BIOTA-FAPESP program (98/05101-8), the Brazilian CNPq (fellowship 300315/2005-8 to AVLF and 140183/2006-0 to LAK) and the National Science Foundation grant DEB-0527441. Field work in Acre was also funded partially by grants from the IBAMA, BSP and CIFOR.

References

- Brown Jr., K.S. & A.V.L. Freitas. 2000. Diversidade de Lepidoptera em Santa Teresa, Espírito Santo. Bol. Mus. Biol. Mello Leitão, N.S. 11/12: 71-116.
- DeVries, P.J. 1987. The butterflies of Costa Rica and their Natural History: Papilionidae, Pieridae, Nymphalidae. Princeton Univ. Pr., 327p, 51 pl.
- Freitas, A.V.L. 2002. Immature stages of *Eteona tisiphone* (Nymphalidae: Satyrinae). J. Lepid. Soc. 56: 286-288.
- Freitas, A.V.L. 2003. Description of a new genus for "*Euptychia*" *peculiaris* (Nymphalidae: Satyrinae): Immature stages and systematic position. J. Lepid. Soc. 57: 100-106.
- Freitas, A.V.L. 2004a. A new species of *Ypthimoides* (Nymphalidae, Satyrinae) from southeastern Brazil. J. Lepid. Soc. 58: 7-12.
- Freitas, A.V.L. 2004b. Immature stages of *Amphidecta reynoldsi* (Nymphalidae: Satyrinae). J. Lepid. Soc. 58: 53-55.
- Freitas, A.V.L. 2007. A new species of *Moneuptychia* Forster (Lepidoptera: Satyrinae: Euptychiina) from the highlands of Southeastern Brazil. Neotrop. Entomol. 36: 919-925.
- Freitas, A.V.L. & C. Peña. 2006. Description of Genus *Guaianaza* for "*Euptychia*" *pronophila* (Lepidoptera: Nymphalidae: Satyrinae) with a description of the immature stages. Zootaxa 1163: 49-59.

- Freitas, A.V.L. & K.S. Brown Jr. 2004. Phylogeny of the Nymphalidae (Lepidoptera). *Syst. Biol.* 53: 363-383.
- Mackay, D.A. & M.C. Singer. 1982. The basis of an apparent preference for isolated host plants by ovipositing *Euptychia libye* butterflies. *Ecol. Entomol.* 7: 299-303.
- Murray, D. 2001. Immature stages and biology of *Taygetis* Hübner (Lepidoptera: Nymphalidae). *Proc. Entomol. Soc. Wash.* 103: 932-945.
- Murray, D. 2003. Immature stages and biology of *Posttaygetis penelea* Cramer (Lepidoptera: Nymphalidae: Satyrinae). *Proc. Entomol. Soc. Wash.* 105: 548-554.
- Murray, D. & D.P. Prowell. 2005. Molecular phylogenetics and evolutionary history of the Neotropical Satyrine Subtribe Euptychiina (Nymphalidae: Satyrinae). *Mol. Phyl. Evol.* 34: 67-80.
- Singer, M.C. & J. Mandracchia. 1982. On the failure of two butterfly species to respond to the presence of conspecific eggs prior oviposition. *Ecol. Entomol.* 7: 327-330.
- Singer, M.C., P.J. DeVries & P.R. Ehrlich. 1983. The *Cissia confusa* species-group in Costa Rica and Trinidad (Lepidoptera: Satyrinae). *Zool. J. Linn. Soc.* 79: 101-119.
- Whittaker, P.L. 1983. Notes on the satyrid butterfly populations of Corcovado National Park, Costa Rica. *J. Lepid. Soc.* 37: 106-114.
- Willmott, K.R. & A.V.L. Freitas. 2006. Higher-level phylogeny of the Ithomiinae (Lepidoptera: Nymphalidae): Classification, patterns of larval hostplant colonization and diversification. *Cladistics* 22: 297-368.

Received 04/V/07. Accepted 09/XI/07.
