

- HALL, J. P. W., D. J. HARVEY & D. H. JANZEN. In press. Life history of *Calydna sturnula*, with a review of larval and pupal balloon setae in the Riodinidae (Lepidoptera). *Ann. Entomol. Soc. Amer.*
- HARVEY, D. J. 1987. The higher classification of the Riodinidae (Lepidoptera). Ph.D. Dissertation, University of Texas, Austin.
- JANZEN, D. H. & W. HALLWACHS. 2003. Philosophy, navigation and use of a dynamic database ("ACG Caterpillars SRNP") for an inventory of the macrocaterpillar fauna, and its food plants and parasitoids, of the Area de Conservacion Guanacaste (ACG), northwestern Costa Rica (<http://janzen.sas.upenn.edu>).
- MABBERLEY, D. J. 1987. *The Plant Book*. Cambridge University Press, Cambridge, UK. 707 pp.
- WILLIAMS, R. O. 1930. Olacales. *Flora Trin. Tob.* 1(2):165–169.
- WORLD AGROFORESTRY CENTRE 2003. Agroforestry database (<http://www.worldagroforestrycentre.org>).

MATTHEW J. W. COCK, *CABI Bioscience Switzerland Center, Rue des Grillons 1, CH-2800 Delémont, Switzerland; email: m.cock@cubi.org* AND JASON P. W. HALL, *Department of Systematic Biology-Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0127, USA; email: hall.jason@nmnh.si.edu*

Received for publication 11 July 2003, revised and accepted 29 October 2003.

Journal of the Lepidopterists' Society
58(1), 2004, 53–55

IMMATURE STAGES OF *AMPHIDECTA REYNOLDSI* (NYMPHALIDAE: SATYRINAE)

Additional key words: Bamboo feeders, Pronophilini.

Immature stages of butterflies are increasing in importance as sources of systematic characters, and often give important clues as to the placement of species in major groups (DeVries et al. 1985, Freitas et al. 2002). The Satyrinae genus *Amphidecta* Butler, 1867 has been placed in the Pronophilini by Miller (1968), although Vilorina (2003, and in press) removed the genus from this tribe without assigning it to any other group. The species in this genus differ from all other known Pronophilini in morphology, habits and distribution (Miller 1968, Vilorina pers. com.), with two species most common in Amazonian lowlands, and a third species, *A. reynoldsi* Sharpe, 1890 (Fig. 1), recorded from low to medium elevation sites in the states of Goiás, Mato Grosso, Minas Gerais, São Paulo and Santa Catarina, and in the Distrito Federal, in Brazil. The habitat of *A. reynoldsi* is riparian forest (including the populations in the Cerrado biome in Goiás, Mato Grosso, Minas Gerais and Distrito Federal), and dense rain forest (São Paulo and Santa Catarina).

The present paper describes the early stages of *A. reynoldsi*, comparing them with those of other known Pronophilini.

Study sites and methods. Adults of *Amphidecta reynoldsi* were studied in the field in two different localities in São Paulo State, SE Brazil: Montane forests in Intervalas Park, Sede (Capão Bonito, 900–1100 m), and in the riparian forests of Monte Mor (600–650 m). One fertile egg was expressed from a very old wild caught female from Monte Mor on 10 November 2002 (no additional eggs were found in the abdomen). The larva was reared in a plastic container cleaned daily; fresh plant material was provided every two or three days (following Freitas 1991). Data were taken on be-

havior and development times for all stages, and head capsules and pupal casting were preserved (AVLF collection). Taxonomic nomenclature follows Miller (1968) and Vilorina (in press).

Description of early stages. Egg. Spherical; cream, without visible ridges or marks under the optic microscope. Height 1.0 mm, diameter 0.9 mm. Duration: 5 days.

First instar (Figs. 1, 2). Head capsule light green with a transverse dark stripe in the front and a darker area between the pair of short scoli on vertex; five pairs of conspicuous pointed black setae (Fig. 2). Head capsule width 0.88 mm; head scoli 0.12 mm. Body beige (light green after feeding), with short black setae; a pair of subdorsal white stripes and additional longitudinal red stripes conspicuous on the last abdominal segments; a pair of short caudal filaments on A10. Maximum length 8.5 mm. Duration: 5 days.

Second instar. Head green with two long red diverging scoli on vertex. Head capsule width 1.16 mm; scoli 1.4 mm. Body slender, light green with many longitudinal white stripes; caudal projections salmon, long, parallel and fused. Maximum length 15 mm. Duration: 4 days.

Third instar. Head as in previous instar; width 1.8 mm, scoli 3.5 mm. Body slender, light bluish green with many longitudinal white lines; caudal projections salmon, long (similar to head scoli) parallel and fused. Maximum length 25 mm. Duration: 6 days.

Fourth (last) instar (Fig. 1). Head green with two long diverging scoli on vertex; these brown with black tips. Head capsule width 2.67 mm; scoli 5.67 mm. Body slender, light bluish green with many longitudi-

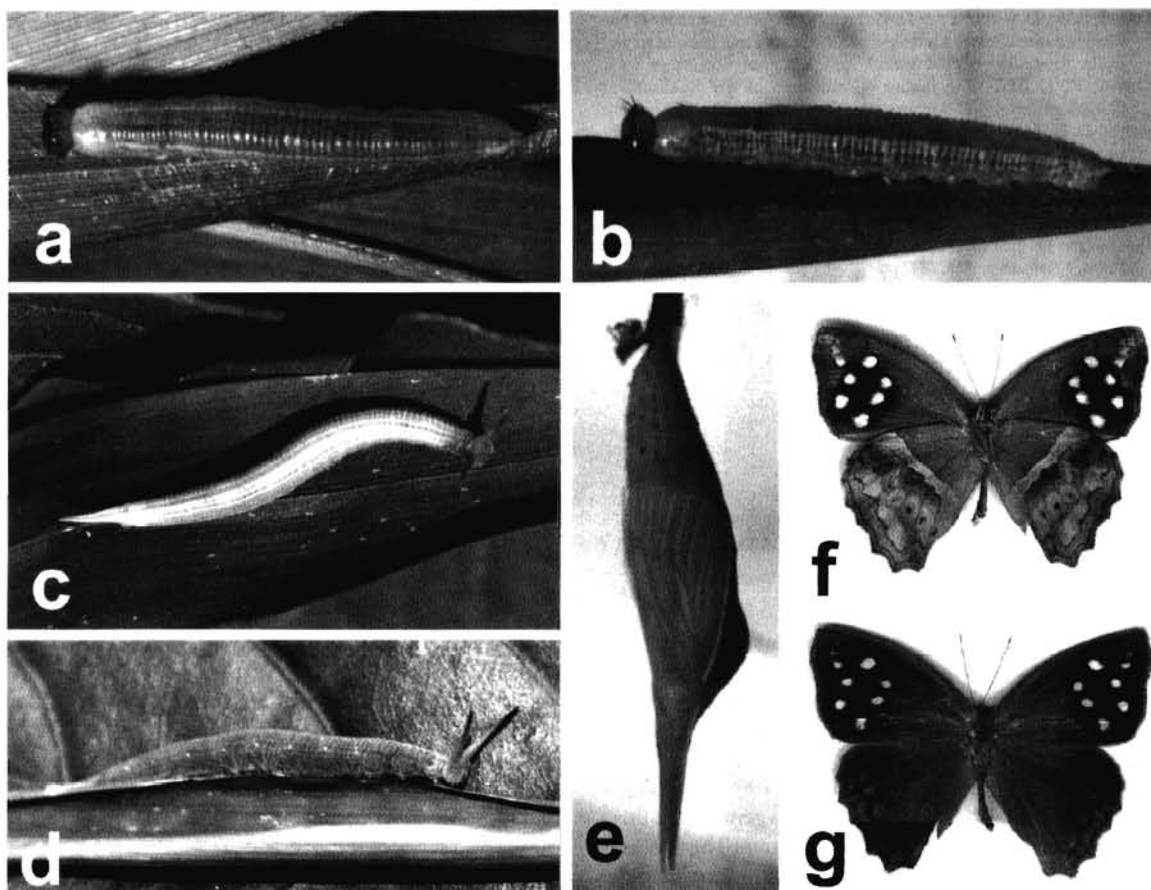


FIG. 1. Partial life cycle of *Amphidecta reynoldsi*. First instar: **a**, dorsal; **b**, lateral. Fourth (last) instar: **c**, dorsal; **d**, lateral. Pupa: **e**, latero-ventral. (Figs. **a–e** from specimens collected at Monte Mor, São Paulo.) Adult male: **f**, ventral; **g**, dorsal (Capão Bonito, São Paulo).

nal white lines; spiracles as well marked white circles; caudal projections light green with salmon ends, long, parallel and fused. Maximum length 38 mm. Duration: 8 days. The prepupal larva is entirely green, and suspended during the night.

Pupa (Fig. 1). Elongated, smooth, with long pointed ocular caps; light green with alar caps bordered with yellow. Total length 27 mm. Duration: 8 days.

Foodplants. The foodplant in the field is unknown, but the larva easily accepted a bamboo (*Merostachys*) from Campinas. The larva ate part of the egg chorion after hatching, and was very active in all instars. In resting position, the larva usually lay along a bamboo leaf with the head towards the leaf apex, becoming relatively inconspicuous. The rarely encountered adults are known from large bamboo thickets, where they are attracted to banana baits.

Discussion. Based on general aspect and habits, the immature stages of *A. reynoldsi* are very similar to

those of *Eteona tisiphone* (Boisduval), a Pronophilini butterfly from the mountains of SE Brazil (Freitas 2002). These include the general shape of larva and pupa, and the foodplant accepted by the larva (a bamboo), but not the shape of the major primary setae on the head capsule (spatulate in *Eteona*). These external macroscopic characters are also similar to those found in most Andean Pronophilini (M. D. Heredia unpublished data), and are divergent from those found in most Neotropical Satyrinae, including the pronophilines in the genus *Pedaliodes* Butler, and relatives (Müller 1886, Pelz 1997, Vilorio pers. com., and unpublished data from 3 species). More descriptions of Satyrinae immatures, especially pronophilines, together with extensive comparisons among adults of most Neotropical genera, are needed to clarify the systematic position of *Amphidecta* within the Satyrinae.

I would like to thank Dr. Keith S. Brown Jr. for reading the manuscript and capturing the female from Monte Mor, and the Fun-



FIG. 2. Head capsule (frontal view) of the first instar larva of *Amphidecta reynoldsi*.

dação Florestal for allowing fieldwork in the Fazenda Intervalas. I also thank Gerardo Lamas, L. Daniel Otero and Carla Penz for comments in the final version. This study was funded by Fapesp (BIOTA-FAPESP program, grants 98/05101-8 and 00/01484-1) and by the National Science Foundation (DEB-0316505).

LITERATURE CITED

- DEVRIES, P. J., I. J. KITCHING & R. I. VANE-WRIGHT. 1985. The systematic position of *Antirrhea* and *Caerois*, with comments on the higher classification of the Nymphalidae (Lepidoptera). *Syst. Entomol.* 10:11–32.
- FREITAS, A. V. L. 1991. Variação morfológica, ciclo de vida e sistemática de *Tegosa claudina* (Eschscholtz) (Lepidoptera, Nymphalidae, Melitaeinae) no Estado de São Paulo, Brasil. *Rev. bras. Entomol.* 35:301–306.
- . 2002. Immature stages of *Eteona tisthphone* (Nymphalidae: Satyrinae). *J. Lepid. Soc.* 56(4):286–288.
- FREITAS, A. V. L., D. MURRAY & K. S. BROWN JR. 2002. Immatures, natural history and the systematic position of *Bia actorion* (Nymphalidae). *J. Lepid. Soc.* 56(3):117–122.
- MILLER, L. D. 1968. The higher classification, phylogeny and zoogeography of the Satyridae (Lepidoptera). *Mem. Am. Entomol. Soc.* 24:iii + 174 pp.
- MÜLLER, W. 1886. Sudamerikanische Nymphalidenraupen: Versuch eines natürlichen Systems der Nymphaliden. *Zool. Jahrb. (Jena)*, 1:417–678.
- PELZ, V. 1997. Life history of *Pedaliodes parepa* from Ecuador (Lepidoptera: Nymphalidae: Satyrinae). *Trop. Lepid.* 8(1):41–45.
- VILORIA, A. L. 2003. Historical biogeography and the origins of the satyrine butterflies of the Tropical Andes (Insecta: Lepidoptera, Rhopalocera). In Morrone, J. J. & J. Llorente-Bousquets (eds.), *Una perspectiva latinoamericana de la biogeografía*; México, D. F.: Las Prensas de Ciencias, Facultad de Ciencias, UNAM, pp. 247–261.
- VILORIA, A. L. In Press. The Pronophilini (Nymphalidae: Satyrinae): synopsis of their biology and systematics. *Trop. Lepid.* 12.

ANDRÉ V. L. FREITAS, *Museu de História Natural and Departamento de Zoologia, Instituto de Biologia, Universidade Estadual de Campinas, CP 6109, Campinas, São Paulo, 13083-970, Brazil*

Received for publication 13 August 2003; revised and accepted 10 October 2003.

Journal of the Lepidopterists' Society
58(1), 2004, 55–58

DISPLAY OF THE “PEACOCK MOTH”: *BRENTHIA* SPP. (CHOREUTIDAE: BRENTHIINAE)

Additional key words: *Anacamptis*, *Cosmopterigidae*, *Gelechiidae*, *Momphidae*, *Tebenna*, *Tineidae*, *Tortrya*.

Species of *Brenthia* Clemens, 1860 (Choreutidae: Brenthiinae) are diurnal microlepidopterans of both New and Old Worlds, with the majority of the 60–80 species confined to tropical areas. Several species are seen frequently in the lowland forests of the Republic of Panama, where they dart about on foliage, with their wings held in distinctive, peacock-like displays (Fig. 1). As the name of the type species, *Brenthia pavonacella* Clemens, 1860, suggests, “peacock” displays are common in *Brenthia*.

Descriptions of these displays are scattered in the literature. Of *B. pavonacella*, in northeastern U.S.A., Forbes (1923:353) comments, “The moth struts about on alighting, with hind wings displayed like *Glyphipteryx* [Cosmopterigidae], the smaller *Anacamptis* [Curtis, 1827, Gelechiidae], etc.” And, of *B. coronigera*

Meyrick, 1918, in India, Fletcher (1920:128) remarks that “The moths strut about jerkily with the hindwings carried nearly at a right angle with the forewings, so that the wings form a sort of cone when seen from behind the insect. This attitude is characteristic of other species of this genus.” His account includes an illustrated lateral view of the moth displaying. According to Robinson et al. (1994:111, 113), some species of South-East Asian Choreutidae “. . . rest with the hind wing drawn forward in front of the forewing. Species of *Brenthia* also move holding their wings in this posture and are mimics of jumping spiders (Salticidae). . . . the metallic spots of the wing pattern representing the spider’s eyes.”

The purpose of this note is to further describe the display and clarify certain points pertaining to its me-