

SHORT COMMUNICATION

**The aquatic habit and host plants of *Paracles klagesi* (Rothschild) (Lepidoptera, Erebidae, Arctiinae) in Brazil**

Aurélio R. Meneses<sup>1</sup>, Marcus Vinícius O. Bevilaqua<sup>2</sup>, Neusa Hamada<sup>2</sup> & Ranyse B. Querino<sup>1</sup>

<sup>1</sup>Embrapa Meio-Norte, Avenida Duque de Caxias, 5650, 64006-220, Teresina-PI, Brasil. ranyse.silva@embrapa.br; aurelioribeiromeneses@gmail.com

<sup>2</sup>Laboratório de Citotaxonomia e Insetos Aquáticos, Coordenação de Biodiversidade, Instituto Nacional de Pesquisas da Amazônia – INPA, Avenida André Araújo, 2936, Aleixo, 69060-001, Manaus-AM, Brasil. nhamada@inpa.gov.br; markus\_bevilaqua@hotmail.com

---

**ABSTRACT.** The aquatic habit and host plants of *Paracles klagesi* (Rothschild) (Lepidoptera, Erebidae, Arctiinae) in Brazil. The aquatic caterpillar *Paracles klagesi* (Rothschild, 1910) was collected from the headwaters of a stream in an ecotone between Cerrado and Babaçu forest in northeastern Brazil. The single caterpillar found was observed feeding on the macrophyte *Tonina fluviatilis* Aubl. (Eriocaulaceae) and other aquatic plants of the family Nymphaeaceae present in the area, but also accepted as food *Elodea canadensis* Michx. (Hydrocharitaceae) and *Cabomba* sp. (Cabombaceae) under laboratory conditions.

**KEYWORDS.** Aquatic insects; Arctiini; Insecta; caterpillar; macrophytes.

---

In the Neotropical region 6,000 species of Arctiinae are recognized (Heppner 1991). Two thousand species are estimated in Brazil (Brown Jr. & Freitas 1999). Among these, *Paracles laboulbeni* (Bar, 1873) is well known for its aquatic larvae, a feature recorded for the first time in Brazil by Adis (1983). He observed them among macrophytes in different types of lakes around Manaus, Amazonas State.

*Paracles laboulbeni* is widely distributed in the Neotropics and its caterpillars feed on aquatic plants and can be found in both lotic and lentic environments (Adis 1983). Although the caterpillar does not have tracheal gills, it submerged in the water and swam actively. Its gas exchange is mediated by air-holding hairs forming a plastron on the dorsal side (Mey & Speidel 2008).

The genus *Paracles* Walker, 1855 has been reported in different regions of Brazil (e.g. Ferro 2007, Ferro & Diniz 2007), but there is no review of this genus in the country. *Paracles laboulbeni* is the only species with aquatic caterpillar registered in Brazil (see Adis 1983). However, two additional species known from Brazil, *P. burmeisteri* (Berg, 1877) and *P. azollae* (Berg, 1877) (Ferro & Teston 2009), have had their aquatic habit recorded from other countries (see Berg 1877a,b).

This study records for the first time the aquatic habit of caterpillars of *Paracles klagesi* (Rothschild, 1910) (Erebidae, Arctiinae, Arctiini) and its association with host plants in an ecotone between Cerrado (Brazilian savanna) and Maranhão Babaçu forests, a palm forest formation from northeastern Brazil.

The study site was a stream in the municipality of Timon, state of Maranhão (05°03'03.3"S, 43°01'52.2"W, 132 m.a.s.l.) (Fig. 1a). The site is the headwaters of a stream with a light

current, the surrounding area occupied by the palm trees *Attalea speciosa* Mart. Ex Spreng (babaçu) and *Mauritia flexuosa* Mart. (buriti) (Arecaceae), with the streambed occupied by macrophytes of Nymphaeaceae and Eriocaulaceae. The area has the phytophysionomy of Cerrado, forming an ecotone with the Babaçu forests (Araújo *et al.* 2006).

A single caterpillar was found and after being collected, it was maintained in an aquarium with aeration and with the water changed daily (Fig. 1b). Twenty-five days after collecting, the caterpillar started to pupate. This stage lasted for 14 days. The cocoon of the pupa was composed of hydrophobic hairs from the caterpillar's body and silk, allowing it to float on the water surface (Fig. 1c). The adult obtained was identified as *Paracles klagesi* (Fig. 1d). The voucher is deposited in the Invertebrate Collection of the *Instituto Nacional de Pesquisas da Amazônia* (INPA).

The caterpillar swam between the plants with undulatory movements. It was fed with the aquatic plants *Tonina fluviatilis* Aubl. (Eriocaulaceae) and other macrophytes of the family Nymphaeaceae that were common at the collecting site. Due to the limited amount of plant material collected *in situ*, it was necessary to complement the caterpillar's food with other plants, so at this stage, it was fed with *Elodea canadensis* Michx. (Hydrocharitaceae) and *Cabomba* sp. (Cabombaceae) (Fig. 1e-f).

*Paracles klagesi* has been previously reported in the states of Mato Grosso, Tocantins and Rondonia (Ferro 2007), although the aquatic habits of the caterpillars and their host plants were unknown. Also, its presence in Maranhão constitutes the first record in northeastern Brazil.



Fig. 1. Collection site (a); *Paracles klagesi*: caterpillar (b); pupae (c); adult (d); *Tonina fluviatilis* (e), *Elodea canadensis* (f).

*Paracles klagesi* has habits similar to those of *P. laboulbeni*, with larvae and pupae having adaptations (hydrophobic hairs) to the aquatic environment. Since species of *Paracles* feed on aquatic macrophytes these insects have been evaluated as biological control agents of weeds, including the water hyacinth (*Eichhornia* Kunth, Pontederiaceae; see Cordo 1996), and *Cabomba caroliniana* Gray (Cabombaceae), a native South American plant, considered an invasive species causing environmental damages in many countries, such as Australia, Canada, the United States, Greece, Japan and China (Schololer *et al.* 2006). Thus, information about aquatic insects and their feeding habits may help to identify potential biological agents to control these aquatic weeds.

#### ACKNOWLEDGMENTS

We thank Dr. Victor Becker for identifying the species of Erebididae, Dr. Phillip Fearnside for reviewing the manuscript, and the anonymous reviewers for additional contributions. CNPq and MCTI/INPA provided partial funding for field activities.

#### REFERENCES

- Adis, J. 1983. Eco-entomological observations from the Amazon. IV. Occurrence and feeding habits of the aquatic caterpillar *Palustra laboulbeni* Bar, 1873 (Arctiidae: Lepidoptera) in the vicinity of Manaus. *Acta Amazonica* 13: 31–36.

- Araújo, J. L. L., Lima, I.M.M.F., Abreu, I.G., Rebêlo, E.M.C.G., Nunes, M.C.S.A. & Araújo, M.M.B. 2006. **Atlas Escolar Piauí: Geo-Histórico e Cultural**. João Pessoa, Editora Grafset, 208 p.
- Berg, C. 1877a. Descriptions de deux nouveaux Lépidoptères de famille des Arctiidae. **Annales de la Société Entomologique de France** **5**: 191.
- Berg, C. 1877b. Estudios lepidopterológicos acerca de la fauna Argentina y Oriental. **Anales de la Sociedad Científica Argentina** **3**: 228.
- Brown Junior, K. S. & Freitas, A.V.L. 1999. Lepidoptera, p. 225–243. In: Joly, C.A. & Bicudo, C.E.M. (orgs) **Biodiversidade do Estado de São Paulo: síntese do conhecimento ao final do século XX**. Volume 5. Invertebrados terrestres. São Paulo, FAPESP. Xviii + 279 p.
- Cordo, H. A. 1996. Recommendations for finding and prioritizing new agents for biological control of water hyacinth control, p. 181–185. In: Charudattan, R., Labrada, R., Center, T.D., & Kelly-Begazo, C. (eds.). **Strategies for Water Hyacinth Control**. Fort Lauderdale, FAO, 198 p.
- Ferro, V.G. 2007. Diversidade de mariposas Arctiidae (Lepidoptera) do Cerrado. Ph. D. Dissertation. Universidade de Brasília, 114 p.
- Ferro, V.G. & Diniz, I.R. 2007. Composição de espécies de Arctiidae (Insecta, Lepidoptera) em áreas de Cerrado. **Revista Brasileira de Zoologia** **24**: 635–646.
- Ferro, V.G. & Teston, J.A. 2009. Composição de espécies de Arctiidae (Lepidoptera) no sul do Brasil: relação entre tipos de vegetação e entre a configuração espacial do hábitat. **Revista Brasileira de Entomologia** **53**: 278–286.
- Heppner, J.B. 1991. Faunal regions and the diversity of Lepidoptera. **Tropical Lepidoptera** **2**, supplement 1: 1–85.
- Mey, W. & Speidel, W. 2008. Global diversity of butterflies (Lepidoptera) in freshwater. **Hydrobiologia** **595**: 521–528.
- Schooler, S., Julien, M. & Walsh, C.G. 2006. Case study: Predicting the response of *Cabomba caroliniana* populations to biological control agent damage. **Australian Journal of Entomology** **45**: 327–330.