Zootaxa 490: 1–8 (2004)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

490

Description of the larva and pupa of *Antarctoecia brasiliensis* Huamantinco & Nessimian, 2003 (Trichoptera, Limnephilidae)

ANA ASUNCIÓN HUAMANTINCO[1,2] & JORGE LUIZ NESSIMIAN[1]

[1]*Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Caixa Postal 68044, Cidade Universitária, 21944-970, Rio de Janeiro, RJ, Brazil*

[2]*Programa de Pós-Graduação em Zoologia, Museu Nacional, UFRJ (ahuamantinco@hotmail.com; nessimia@acd.ufrj.br)*

Abstract

Larva and pupa of *Antarctoecia brasiliensis* Huamantinco & Nessimian, 2003 are described and illustrated from the Rio Aiuruoca, Minas Gerais, Brazil, and compared to other Neotropical limnephilid genera. Some aspects of habitat and dietary items are presented.

Key words: *Antarctoecia brasiliensis*, Limnephilidae, Trichoptera, larva, pupa, Neotropics, Brazil

Introduction

In South America, the family Limnephilidae is represented by seven genera and 35 species, all endemic and distributed in the Chilean subregion and in the high Andes of the Brazilian subregion. Flint (1982) associated and described the larvae of all known South America genera, except *Antarctoecia*. A tentative association for *A. nordenskioeldii* Ulmer based on Bolivian larval material was provided by Flint (1982), but these specimens are probably not congeneric (Flint *et al.* 1999). Here, we describe the larva and pupa of *Antarctoecia brasiliensis* Huamantinco and Nessimian, 2003, this being the first firm association of the immature forms and adults in the genus.

Methods

Larvae and pupae were collected with Surber nets and by hand. Terminology for larval morphology follows that of Wiggins (1996). Larvae were associated with adults by the metamorphotype method (Wiggins 1996). Dietary items were observed using standard gut content analysis.

Accepted by R.W. Holzenthal: 2 Apr. 2004; published: 13 Apr. 2004

Description

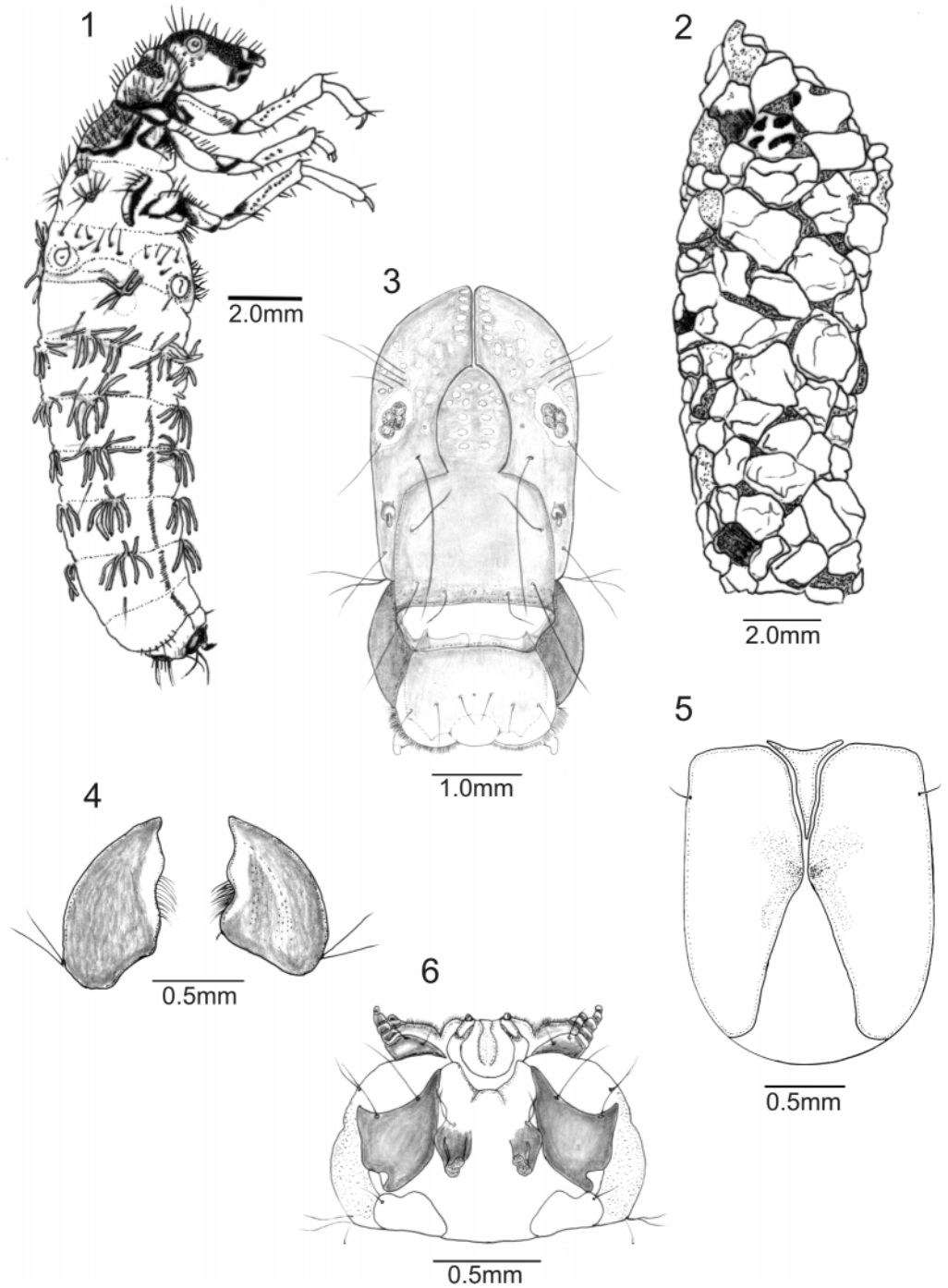
Larva (Figs. 1–11): Total length without case up to 19 mm, maximum abdominal width 4 mm.

Head (Figs. 3–6): Reddish brown, hypognathous, 3 times longer than wide, slightly depressed anteriorly with muscle impressions in posterior area of frontoclypeal apotome and both sides of coronal suture (Fig. 3). Eyes positioned anterolaterally on superior third of head. Mandibles with median setal brush, apex without indentation, spoon-like (Fig. 4). Ventral apotome elongated, posterior end thin, occupying 2/3 of ventral ecdysial line, anterior end concave with anterolateral angles sharply elongated to about 1/3 apotome length (Fig. 5). Labrum with setal brush at most of anterolateral margin (Fig. 6).

Thorax (Fig. 7): *Pronotum*-Yellowish brown, 1.4 times longer than wide. Anterior margin convex, bearing double row of setae, with short, thin, lightly colored setae mixed with dark brown spiniform setae. Posterior margin of pronotum rounded, thick, darkly sclerotized. A mixture of thick, both short and long setae, sparsely distributed on dorsal surface. Transverse depression present on anterior third, and numerous muscular impressions posteriorly. *Meso- and metanota*-Sclerites reddish brown. Mesonotal plates well developed, with many long, dark setae distributed between the 3 primary setal areas. Metanotal plates sa1, sa2 and sa3 with mixture of thick, both long and short setae; membranous surface around sa1 with some small setae; sclerotized points immediately posterior to anterior sulcus. Prosternal plate retanguloid or pentagonal. Prosternal spine approximately half length of anterior coxa. Meso- and metasterna with pair of small setae medially and pair of setae near base of each coxa. Mesosternum with irregular row of small sclerotized points on posterior margin. Metasternum without such points. Legs (Fig. 8): Foreleg trochanter without brush; 3 thick apical setae and 4 setae on the ventral surface. Femur slender, approximately same length as tibia; 2 rows of ventral setae, external row of 6 spiniform long, thick setae, inner row of yellowish short, thin setae. Tibia with 4 dorsal setae on distal end, 2 dark and thick, 2 light and thin; 2 ventral spurs present on distal end. Apex of tarsus with 2 dorsal and 2 ventral setae. Basal seta of tarsal claw almost of same length as claw. Middle and hind legs essentially identical to forelegs, except for external row of ventral setae on femora with 5 spiniform setae.

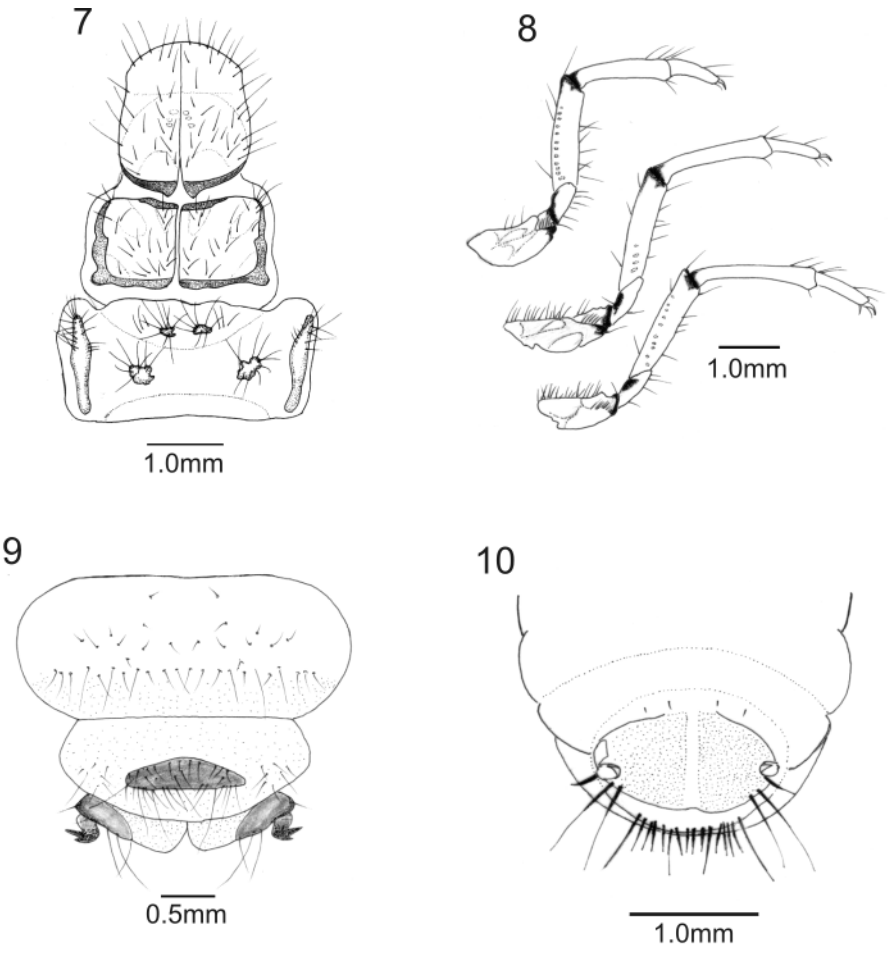
Abdomen (Fig. 1): Lateral line extending from half of segment II to segment VIII. Forked lamellae absent. Ventral chloride epithelia present as transverse oval sclerotized rings, 6 times wider than long on segments II and VII and 8 times wider than long on segments III–VI. Abdominal segment I with well developed dorsal, ventral, and lateral humps; setae present anterior to dorsal hump, and dorsal and ventral to lateral humps; ventral hump large and setose, with most setae inserted on distinct, sometimes convex sclerotized areas. Gills present on segments II–VII; position and number of filaments as in Figure 11. Tergite VIII with transverse row of alternating short and long setae posteriorly (Fig. 9); other smaller setae sparsely distributed over all of segment VIII. Tergite IX rectanguloid, dark brown with thick setae over all of surface, longer on anterior margin and

extending to lateral membrane. Ventral surface of segment IX with row of 6 setae at half length (Fig. 10). Anal prolegs with 1 thick curved seta on distal end of lateral sclerite (Fig. 9), basal tuft of 3 long thick setae; ventral surface membranous, without setae (Fig. 10).



FIGURES 1–6. *Antarctoecia brasiliensis*. 1. larva, lateral view; 2. case, lateral; 3. head, frontal; 4. mandibles, dorsal; 5. head, ventral; 6. maxillolabium, ventral.

Case (Fig. 2): Length 19.5 mm. Constructed of mineral matter, oval in cross section, ventral surface flattened, slightly curved and posteriorly tapered. Posterior end closed off with silk, but with a central circular opening.



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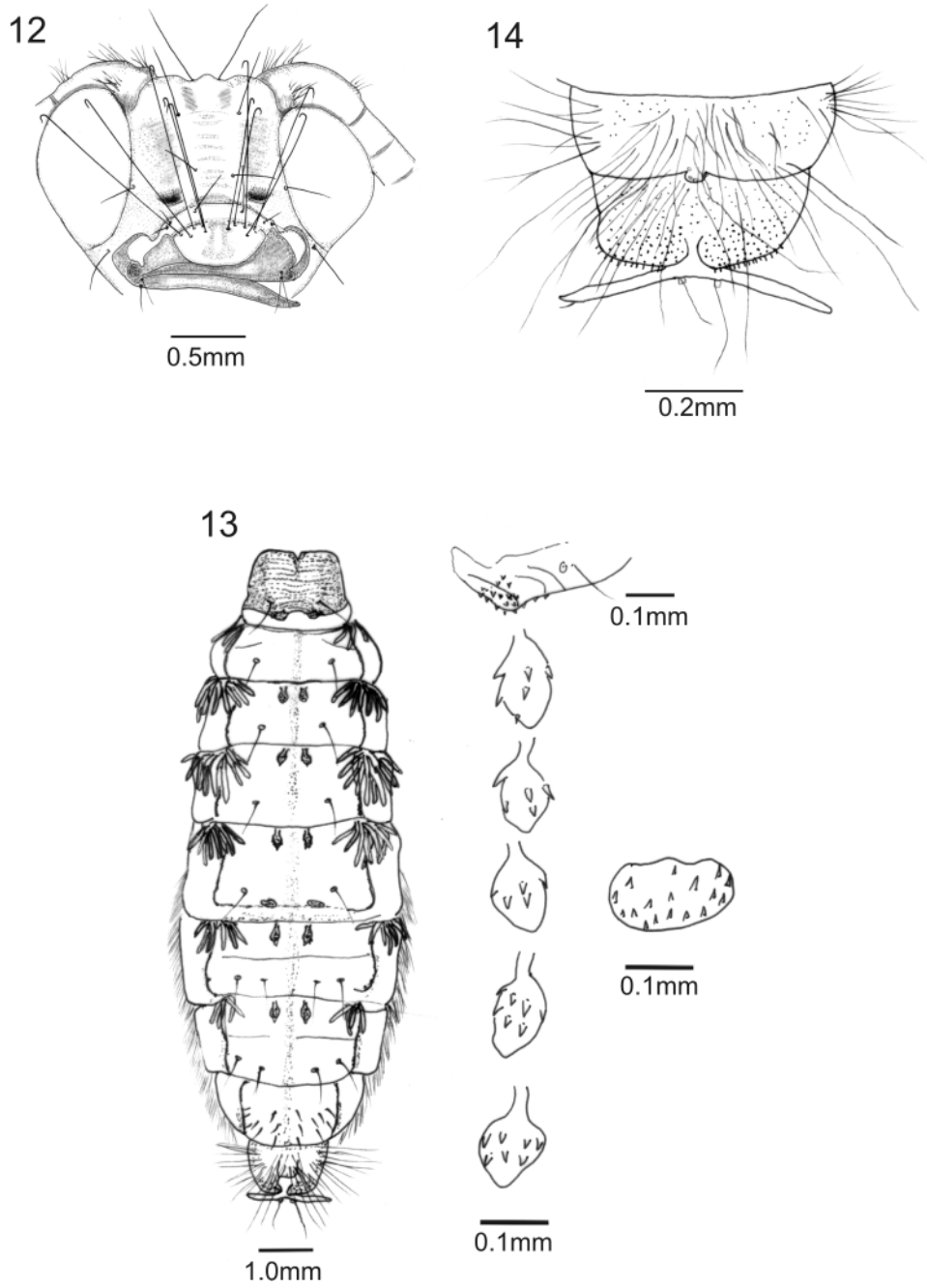
	13 7	14 10	14 9	11 7	7 5	3 5	
	5 15	9 4 14	7 12 9	5 12	5 8	5	
	I	II	III	IV	V	VI	VII	VIII

FIGURES 7–11. *Antarctoecia brasiliensis*. 7. thorax, dorsal; 8. fore, mid and hind legs, lateral; 9. apex of abdomen, dorsal; 10. apex of abdomen, ventral; 11. Gill diagram: position and number of filaments on abdominal segments I–VIII.



FIGURES 12–14. *Antarctoecia brasiliensis*. 12. pupa, head, frontal; 13. abdomen and hook plates of segments 1, 3–7; 14. apex of abdomen, dorsal.

Pupa (Figs. 12–14): Length 14.5–16 mm. Head (Fig. 12): 3 pairs of setae on margin of frontoclypeal area; 2 pairs of setae below eyes; 2 pairs of setae on frontal region, 1 pair on vertex between antennae. Anterior tentorial pits well marked. Antennal scape with ventro-

lateral tuft of 9 setae, dorsal tuft of 4–5 setae and posterior tuft of 7–8 setae; pedicel with dorsal tuft of 9 setae. Labrum with 5 pairs of thick, rigid, long apically hooked setae. Mandibles without teeth, base wide, apex acute, inner margin finely serrate. Maxillary palp 3-segmented in male, 5-segmented in female. Thorax: Pronotum with 4 pairs of setae, mesonotum with 12–18 pairs, metanotum with 3–6 pairs. Thick, black setae present on all coxae; forecoxa (6 setae), middle coxa (12–17 setae) with natatory setae long and thin, arranged in double row only on tarsomeres 1–4 in middle leg; wing pads reaching abdominal segment IV. Abdomen (Fig. 13): Lateral fringe of long thin dark brown setae extending ventrolaterally from half of segment V to segment VIII. Abdominal segment I with transverse striae on both sides of dorsal median line; hook plates of posterior margin bearing small spines (9–19). Hook plates present on segments III–VII, anterior plates rhomboidal and pedicelate bearing 4–9 pointed hooks; posterior plates present only on segment V, rectangular and bearing 9–16 small hooks. Number of hooks varying between individuals and between right and left plates of the same individual. Segment IX (Fig. 14) with tegument sclerotized, pale brown, bearing numerous dorsal setae; posterior margin with 2 flattened expansions covered with small spines; apical processes transverse to body axis, of same length as segment IX, cylindrical, covered with very small spines; 2 subterminal setae on inner surface. The last larval instar case is used as the pupal case, but the anterior opening is closed by silk.

Material examined: Larval and pupal specimens deposited in the Coleção Entomológica do Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro (DZRJ).

Larvae: Brazil, Minas Gerais State, Itamonte, Rio Aiuruoca, 1860 m alt., 15-ix-1996, rocky substratum in riffle, J.L. Nessimian; A.L. Carvalho & N. Ferreira Jr. leg., 5 larvae (DZRJ590); 15-ix-1996, leaf packs in riffles, J.L. Nessimian; A.L. Carvalho & N. Ferreira Jr. leg., 1 larva (DZRJ591); 18-x-1997, leaf packs in riffles, J.L. Nessimian; A.L. Carvalho & N. Ferreira Jr. leg., 1 larva (DZRJ592); 18-x-1997, rocky substrate, riffle, J.L. Nessimian; A.L. Carvalho & N. Ferreira Jr. leg., 1 larva (DZRJ593); 11-ix-1998, rocky substrate, pool, J.L. Nessimian; A.L. Carvalho & N. Ferreira Jr. leg., 2 larvae (DZRJ594); 07-ix-2000, rocky substrate, J.L. Nessimian leg., 3 larvae (DZRJ596); 07-ix-2000, gravel and pebble substrate, rapids, J.L. Nessimian leg., 3 larvae (DZRJ597); 08-ix-2000, pebbles, riffle, J.L. Nessimian leg., 7 larvae (DZRJ598); 05-iv-2001, rocky substrate, J.L. Nessimian, A.L. Henriques-Oliveira & A.A. Huamantinco leg., 1 larva (DZRJ599); 13-x-2001, rocky substrate, riffle, J.L. Nessimian leg., 15 larvae (DZRJ600).

Pupae: Same locality of larvae, 2-x-1999, rocky substrate, J.L. Nessimian leg., 3 pupae (DZRJ595); 13-x-2001, rocky substrate, J.L. Nessimian leg., 18 pupae (DZRJ601); 13-x-2001, rocky substrate, J.L. Nessimian leg., 1 pupa (DZRJ602); 26-x-2002, rocky substrate, J.L. Nessimian leg., 2 pupae (DZRJ603).

Biology and habitat: Larvae and pupae were collected attached to rocky substrate in rapids and riffles from a third order section of the Rio Aiuruoca. At the collection site, the

river is 6-8 m wide, with clean and cold water. Gut content analysis indicated that larvae are scrapers and feed predominately on algae (Cyanophyceae, Desmidiaceae, Diatomaceae). Plant fibers and detritus were also ingested. Pupae were found fixed by the anterior end of the pupal case under boulders in the splash zones of riffles.

Distribution: *Antarctoecia nordenskioeldii* is known from the provinces of Jujuy and Catamarca, Argentina, at elevations of 4500–5000 meters (Flint *et al*., 1999). *Antarctoecia brasiliensis* is known only from the Mantiqueira mountain range at elevations of 1800–1900 meters, state of Minas Gerais, Brazil (Huamantinco & Nessimian, 2003).

Comments: The larva of *Antarctoecia* is characterized by a number of distinctive features, inlcuding: the elongated head capsule, position of the eyes on the posterior third of the head, mandibles without teeth, ventral apotome long with sharp anterolateral angles, pronotum elongated with anterior margin convex, trochanter without brush, and glabrous tibia.

The larva of *Antarctoecia* differs from *Anomalocosmoecus* by the absence of a dorsal carina on the head and by the absence of enlarged setae on the inner margins of all tibiae; from *Austrocosmoecus* by mandibles with entire tips, legs without trocanteral brush, dorsal abdominal gills present on segments II–VII and by lacking forked lamellae; from *Magellomyia* by absence of mandibular teeth, tibiae of mid and hind legs lacking minutely serrated inner margins, ventral ovoid rings of segments II–VII each about 8 times wider than long, and anal prolegs without setae ventrally; from *Metacosmoecus* because the pronotum is longer than wider, the metanotum lacks setae on the membrane posteriorly, the anal prolegs with only 4 long thick setae and ventrally without setae on the membrane; from *Monocosmoecus* because head and thorax sclerites are reddish brown without pale stripe middorsally, mandibles without teeth, inner margins of tibiae and tarsus lacking fringes of short setae, first abdominal sternum lacking sclerites, and ovoid rings present on abdominal segments II–VII; from *Platycosmoecus* by lacking sclerites on the first abdominal segment and absence of expansion on basal half of fore femur. *Antarctoecia brasiliensis* differs from the tentative *? Antarctoecia* larva described by Flint (1982) because the former has mandibles without teeth, the thorax lacks short dark bladelike setae on all nota, and tibiae and tarsi of all legs lack rows of bladelike setae on inner margins.

The pupa has abdominal dorsal hook plates similar in form to *Austrocosmoecus* (Marlier, 1963), but differs from this and other described pupae of South American Limnephilidae by the presence of two flattened expansions covered with spines on abdominal segment IX and the apical processes transverse to the body axis.

Acknowledgements

We thank Dr. Alcimar do Lago Carvalho (Museu Nacional do Rio de Janeiro), Dr. Ralph W. Holzenthal (Department of Entomology, University of Minnesota) and anonymous referees for criticisms, suggestions and English improvement. Angela Manzollilo

Sanseverino helped with the English translation. Ana Luisa S. Nessimian made the final edition of the drawings. The Brazilian Council of Scientific and Technological Development (CNPq) provided financial support.

References

Flint, O.S., Jr. (1982) Studies of Neotropical Caddisflies, XXX: Larvae of the genera of South American Limnephilidae (Trichoptera). *Smithsonian Contributions to Zoology*, 355, 1–30.

Flint, O.S., Jr., R.W. Holzenthal, & S.C. Harris (1999) *Catalog of the Neotropical Caddisflies (Insecta: Trichoptera)*. Special Publication, Ohio Biological Survey. Columbus, Ohio, 239 pp.

Huamantinco, A.A. & J.L. Nessimian (2003) A new species of *Antarctoecia* Ulmer, 1907 (Trichoptera: Limnephilidae) from Southeastern Brazil. *Aquatic Insects*, 25(3), 225–231.

Marlier, G. (1963) Les mètamorphoses de deux Limnephilidae (Trichoptera) del'Amerique du Sud. *Arch für Hydrobiologie*, 59, 243–252.

Wiggins, G..B. (1996) *Larvae of North American Caddisfly Genera (Trichoptera)*. Second Edition. University of Toronto Press. Toronto and Buffalo, 457 pp.

