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Ceratotrichia Flint, 1992 (Trichoptera: Hydroptilidae) larval and pupal description and new genus records for Brazil

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Abstract

PES AMO, HAMADA N. 2004. *Ceratotrichia* Flint, 1992 (Trichoptera: Hydroptilidae) larval and pupal description and new genus records for Brazil. Entomotropica 19(1):31-37.

The first description of *Ceratotrichia* larva and pupa is provided. Also, this is the first time that this genus is reported in Brazil; the specimens were collected in streams in Presidente Figueiredo County, Amazonas state. Association of the immatures with the adults was made using the metamorphotype technique, and identification was made by comparison of pharate adults with the original genus description. The larva has morphological characteristics typical of the Leucotrichiini tribe. Other new records for Brazil include the genera *Alisotrichia* Flint and *Zumatrichia* Mosely, while the record of *Anchitrichia* Flint is new for Brazilian Amazonia.

Additional key words: *Alisotrichia, Anchitrichia*, aquatic insects, faunistics, Leucotrichiini, *Zumatrichia*.

Resumo

PES AMO, HAMADA N. 2004. Descrição da larva e pupa de *Ceratotrichia* Flint, 1992 (Trichoptera: Hydroptilidae) e novos registros de gêneros para o Brasil. Entomotropica 19(1):31-37.

Larva e pupa de *Ceratotrichia* sp. é descrita e ilustrada pela primeira vez. Também, é a primeira vez que esse gênero é registrado no Brasil; os exemplares foram coletados em cursos d'água no município de Presidente Figueiredo, Amazonas, Brasil. Associação de imaturos com adultos foi realizada pelo método de metamorfotipo e, a identificação ocorreu por meio da comparação de adultos farados com a descrição original do gênero. Larvas apresentam características morfológicas típicas da tribo Leucotrichiini. Outros novos registros para o Brasil incluem os gêneros *Alisotrichia* Flint e *Zumatrichia* Mosely, e para Amazônia brasileira, *Anchitrichia* Flint.

Palavras chave adicionais: *Alisotrichia*, *Anchitrichia*, faunistica, insetos aquáticos, Leucotrichinii, *Zumatrichia*.

Introduction

Hydroptilidae includes the microcaddisflies whose adult are between 1.5 and 5 mm in length. This family is divided in two subfamilies: Ptilocolepinae, with holartic distribution and Hydroptilinae, which is cosmopolitan. The latter subfamily is composed of six tribes; the following are restricted to the new world: Hydroptilini, with three genera, Leucotrichiini, with 16 (nine in Brazil), Neotrichiini, with four and Ochrotrichiini, also with four genera. The cosmopolitan tribes are: Orthotrichiini and Stactobiini; each has two genera in the neotropics but, in Brazil, neither has so far been collected (Flint et al. 1999).

Ceratotrichia belongs to the Leucotrichiini tribe and was described by Flint (1992), with two species; *Ceratotrichia fairchildi* Flint, from Panama and *Ceratotrichia flavicoma* Flint, 1992, from Ecuador, Peru and Venezuela. Descriptions were based on adults; the immature stages of this genus were unknown.

The objectives of the present study are to describe the larva and pupa of *Ceratotrichia* sp. and to provide information on new records of Leucotrichiini genera in Brazil and in the Amazonian region.

Material and Methods

Field sampling was done in streams in Presidente Figueiredo County (lat 02º02'S, long 60º02'W), located 107 km from Manaus, Amazonas, Brazil, between February 2000 and February 2003.

The metamorphotype technique (Wiggins, 1996) was used to associate *Ceratotrichia* sp. immatures with pharate adults.

Identification of the collected specimens until genus level was made by comparing pharate adults with the original description and the larval key to genera by Flint (1992, 1996).

The larval identifications of other genera in the Leucotrichiini tribe were made with the help of the larval identification key provided by Wiggins (1996). When needed, structures or specimens were mounted between slide and coverslip, using Euparal® as mounting media. Morphological terminology is based on Marshall (1979) and Wiggins (1996). The specimens were photographed with a digital camera under a dissecting and/or optical microscope, and were deposited in the invertebrate collection of Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brasil.

Results and Discussion

Taxonomy

Ceratotrichia Flint, 1992

(Figures 1-27)

Ceratotrichia Flint, 1992: 527, figs. 32.1-32.9.
aff Zumatrichia Pes, 2001: 117; figs. 27a-27d

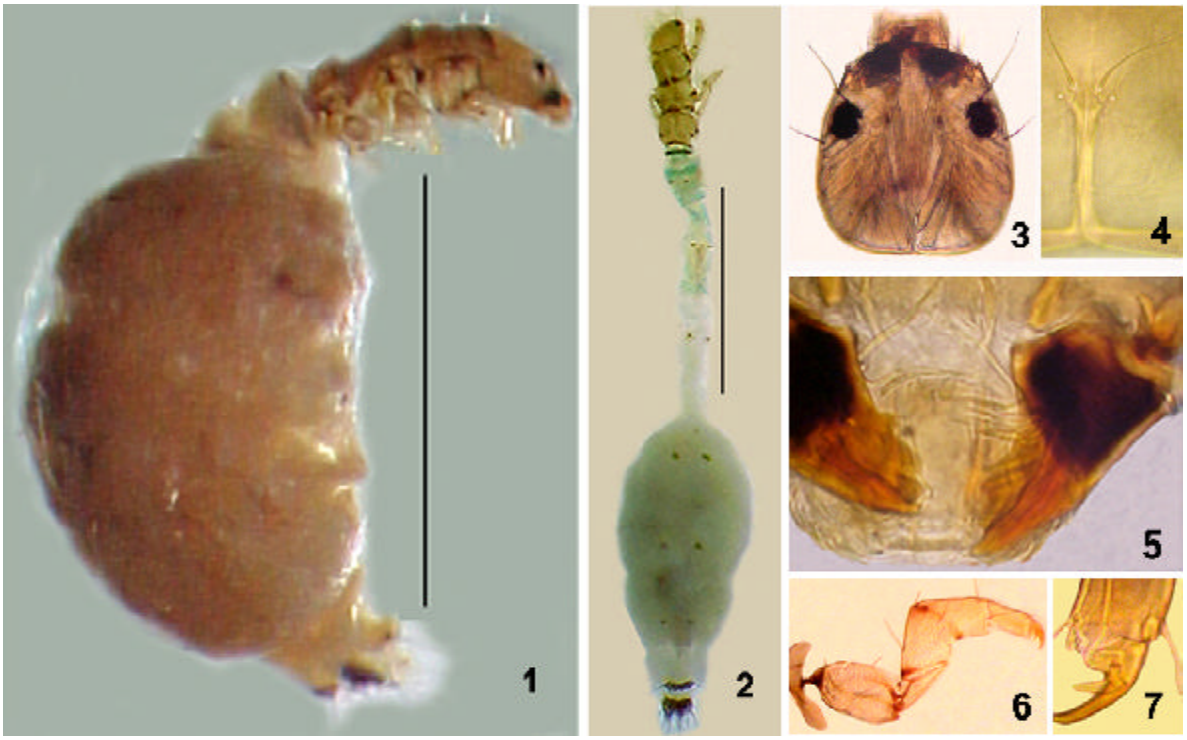
Ceratotrichia sp. larval description

Since the larva of other species in this genus are unknown, the diagnostic characters provided here for the genus could change when larvae of additional species become known.

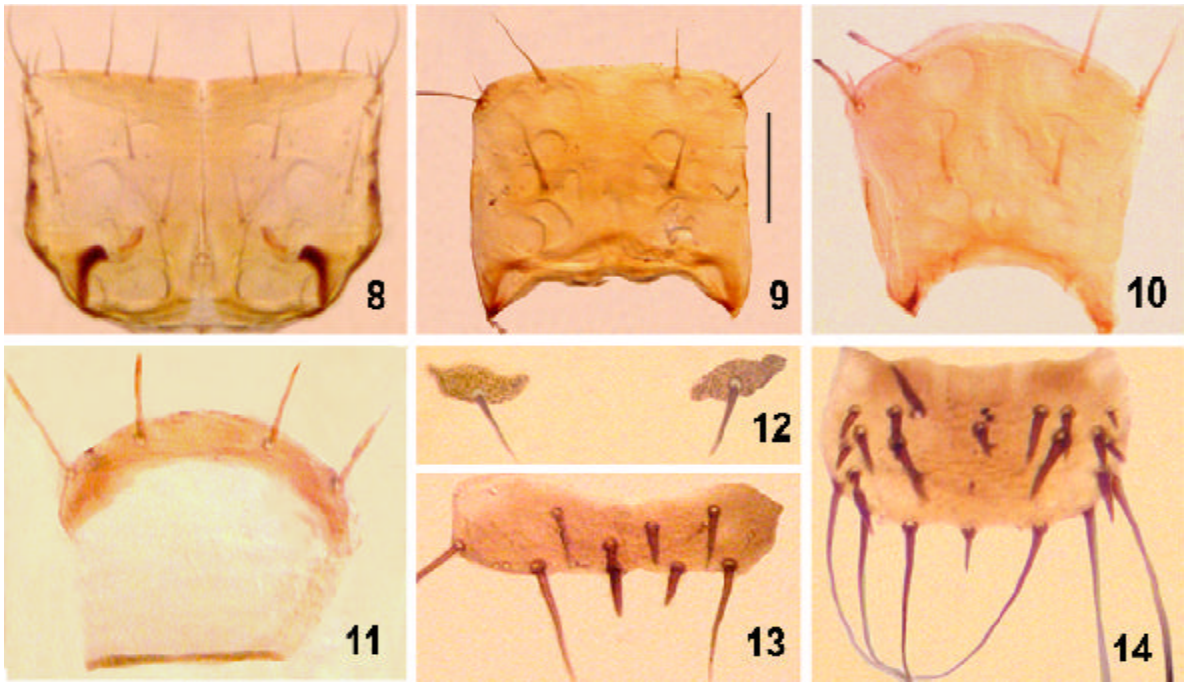
Last-instar larva (Figures 1 - 2): total length 1.6 - 2.40 mm (n = 15); measurements of larvae can differ after fixation because larva has a retractile abdomen. Head (Figure 3) with frontoclypeal sutures not distinct, only coronal suture distinct (Figure 4); antenna short (with two segments, second one 1/3 the length of the first, with one seta) located on anterior margin of head, near mandible insertion. Three setae near the eyes, one long and thick on anterior margin of eye and two small on its posterior margin. One long seta in the lateral margin of head, below the eyes. Mandibles sclerotized, with four teeth well defined and penicillus (sensu Marshall 1979) (Figure 5); labrum membranous, with three pairs of thick setae and one series of thin setae on anterior margin. Legs stout (Figure 6), anterior leg shorter than the others, with trochantin small and truncated, with three spines. Tarsal claw with strong, articulated basal setae, giving the impression that the claw is bifid (Figure 7). Pronotum divided by ecdysial suture, ornamented with depressions with coloration ligther than other regions; anterior margin with four pairs of long setae and three pairs of short setae, one pair of setae in marginal region and two pairs in medial region (Figure 8). Mesonotum without suture and with depressions of coloration ligther than other regions, with two pairs of long setae and one pair of short setae on anterior margin, and one pair in medial region (Figure 9). Metanotum without suture, with depressions of ligther coloration than other regions, and two pairs of long setae and one pair of short setae on anterior margin and one pair in medial region (Figure 10). Abdomen with segments I – IV thin and of similar size (Figure 2), V - VII, wider than segments I - IV; all segments with one long and thin seta, lateral region. Abdominal segment I has two wide sclerites, one anterior, with short and strong setae, and one thin, posterior (Figure 11); segments II – VII with one pair of small dorso-lateral sclerites, each with one seta (Figure 12); segment VIII with one wide sclerite, with two long and stiff setae, in the posterior region, alternating with six short and stout setae, and four setae of similar size on the anterior margin (Figure 13). Segment IX with one sclerite, with six long and stiff setae on the posterior margin, and several short and stout setae covering the sclerite (Figure 14). Anal proleg short and free from the abdomen, with one claw, lateral sclerite with three long setae.

Pupal description (Figures 15-24): total length 2.2 - 2.4 mm (n = 10). Mandibles simple, with base dilated and inner margin serrate. Labrum membranous, with two series of eight short setae. Dorsally, abdominal segments III-VII with one pair of anterior plates, segments III - IV with one pair of posterior plates (Figure 15); segment III with large anterior plate, with six short and stout hooks (Figure 16), posterior plate with four short hooks (Figure 17); segment IV with anterior plate similar to the one of segment III (Figures 18-19); segment V with anterior plate with four stout hooks on the margin (Figure 20), anterior plate of segment VI with four teeth (Figure 21), and anterior plate of segment VII with eight hooks of similar size (Figure 22).

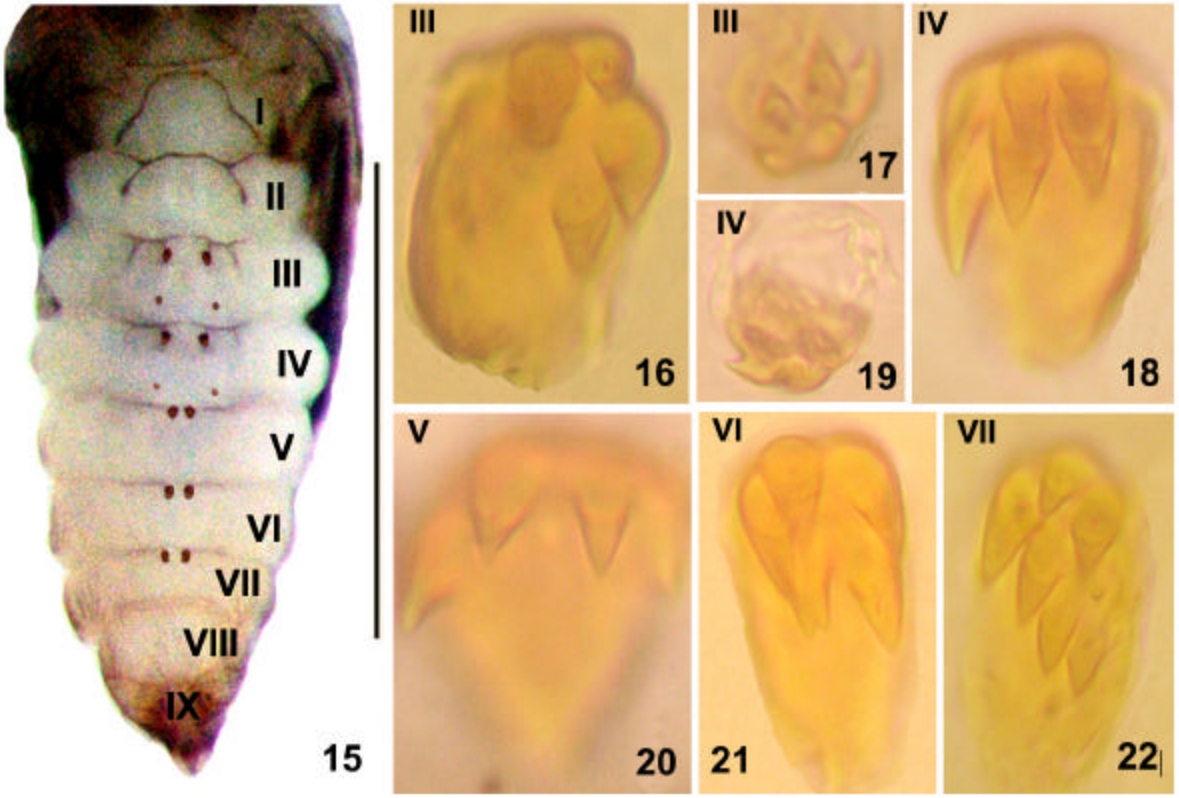
It is possible to distinguish male and female of this genus in the pupal stage: The female has simple antennae, three ocelli and absence of warts in the posterior region of the head (Figure 23). The male has pedicel and scape dark and enlarged, posterior warts well developed and absence of median ocellus (Figure 24).



FIGURES 1-7. *Ceratotrichia* sp. larva. **1.** Lateral view of larva with contracted abdomen (scale bar = 1 mm). **2.** Dorsal view of larva with extended abdomen. **3.** Head dorsal view. **4.** Coronal suture, head dorsal view. **5.** Larval mandibles, ventral view. **6.** Mesothoracic leg. **7.** Foreleg tarsal claw.



FIGURES 8-14. *Ceratotrichia* sp. larva. **8.** Pronotum. **9.** Mesonotum (scale bar = 0.1 mm). **10.** Metanotum. **11.** Dorsal sclerites of abdominal segment I. **12.** Dorsal sclerites of abdominal segment II. **13.** Dorsal sclerites of the abdominal segment VIII. **14.** Dorsal sclerites of abdominal segment IX.



FIGURES 15-22. *Ceratotrichia* sp. pupa. **15.** Dorsal view of abdomen (scale bar =1 mm). **16.** Hooks of abdominal segment III anterior plate. **17.** Hooks of abdominal segment III posterior plate. **18.** Hooks of abdominal segment IV anterior plate. **19.** Hooks of abdominal segment IV posterior plate. **20.** Hooks of abdominal segment V anterior plate. **21.** Hooks of abdominal segment VI anterior plate. **22.** Hooks of abdominal segment VII anterior plate.

FIGURES 23-26. *Ceratotrichia* sp. pupa. **23.** Female head, dorsal view. 24. Male head, dorsal view, arrow indicates enlarged scape and pedicel of antennae. **25.** Smooth pupal case. **26.** Pupal case with folds (scale bar = 1 mm).

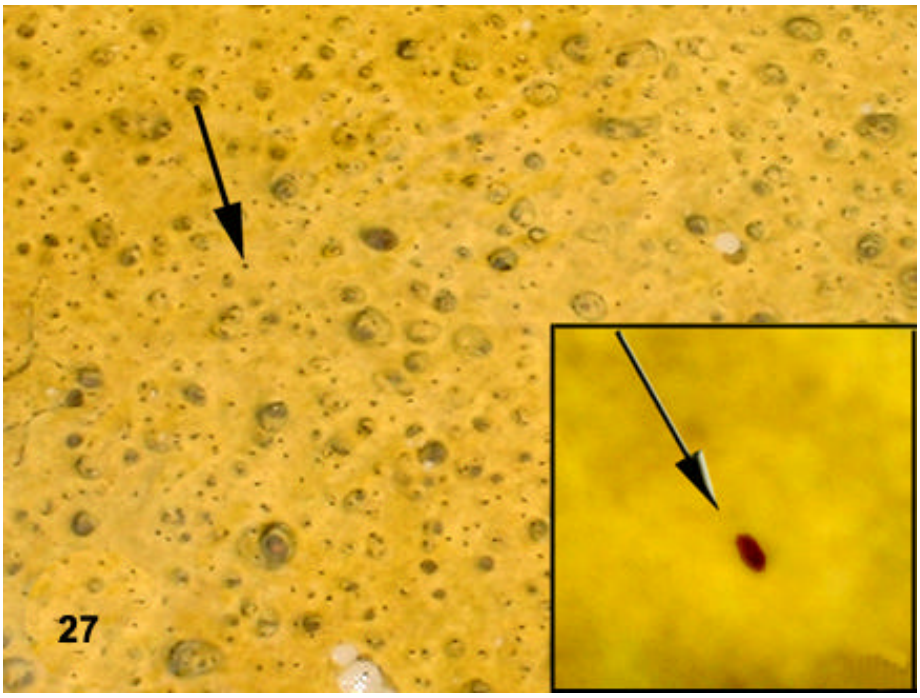


FIGURE 27. Bedrock streambed with *Ceratotrichia* sp. larval and pupal case in Lages stream, Presidente Figueiredo County, Amazonas, Brazil (arrows indicate the case).

Larval case (Figures 25-26): mean length 3 mm, mean width 1.5 mm (n = 10). Case has elliptical shape and circular opening, at both ends; it is constructed with silk and can be smooth (Figure 25) or with folds (Figure 26). Case is fixed to the bedrock of the streambed or on loose stones (Figure 27).

Taxonomic comments

Ceratotrichia sp. larva shows the characteristics of the tribe, including the divided pronotum and short and stout legs. Larvae of this genus have one sclerite in the dorsal region of all abdominal segments, while larvae of *Zumatrichia, Leucotrichia* and *Anchitrichia* have two sclerites. *Ceratotrichia* sp. case is smaller (3 mm) than the one of *Zumatrichia* (3.5 mm) and larger than the one of *Leucotrichia* sp. (3 mm). Shape and arrangements of plates with hooks in *Ceratotrichia* sp. pupae differ from those of *Leucotrichia brasiliana* Sattler & Sykora 1977, because the pupae of the latter species have one pair of posterior plates on the dorsal region of segments III-V and all of the plates have several small hooks of similar size. *Zumatrichia antilliensis* Flint pupae have plate configuration similar to that of *L. brasiliana*. Pupae of *Anchitrichia duplifurcata* Flint, 1983 described by Guahyba (1991), have one pair of posterior plates on segments III-VII and two pairs of anterior plates on segments IV-VI; all the posterior plates have six strong teeth and the anterior plates have five strong teeth; all the plates have several small teeth. *Alisotrichia hirudopsis* Flint and *Alisotrichia orophila* Flint have dorsally posterior plates on segments III-V and anterior plates on segments III-VII (Flint 1964, 1968).

Specimens examined

Ceratotrichia sp.

BRAZIL, Amazonas, Presidente Figueiredo, Cachoeira da Maroca, lat 02º01'S, long 59º49'W, 31.i.2003. A. M. O. Pes; J. O. da Silva; 5 larvae, 5 pupae in 80% ethanol. Igarapé da Onça, Balneário Recanto da Pantera, lat 02º02'S, long 59º50'W, 18.ii.2003. A. M. O. Pes; J. O. da Silva, 15 larvae, 10 pupae in 80% ethanol, 1 pupa in permanent slide mount; 05.ix.2000, A. M. O. Pes; J. O. da Silva, 1 pharate male (genitalia in glycerin; antennae, pupal exuviae and mandible in permanent slide mount and abdomen in 80% ethanol); 12.xii. 2001, A. M. O. Pes; C. A. Azevêdo; F. A. Pessoa, 1 pharate female in 80% ethanol. Cachoeira da Dona Rosa, km 111 BR-174, lat 02º00'S, long 60º01'W, 27.ii.2000, A. M. O. Pes; Y. B. Alencar; U. C. Barbosa, 1 pharate female in 80% ethanol. BRAZIL, Amazonas, Presidente Figueiredo, igarapé das Lages, lat 02º01'S, long 60º02'W, 31.i.2003. A. M.O. Pes; J. O. da Silva, 6 larvae in 80% ethanol.

Alisotrichia sp.

BRAZIL, Amazonas, Presidente Figueiredo, Cachoeira da Maroca, lat 02º01'S, long 59º49'W, 31.i.2003. A. M. O. Pes; J. O. da Silva, 3 larvae in 80% ethanol.

Anchitrichia sp.

BRAZIL, Amazonas, Presidente Figueiredo, igarapé Canoas, lat 01º46'S, long 60º28'W, 20.vii.2001, A. M. O. Pes; J. O. da Silva, 5 larvae in 80% ethanol.

Leucotrichia sp.

BRAZIL, Amazonas, Presidente Figueiredo, Cachoeira da Maroca, lat 02º01'S, long 59º49'W, 31.i.2003. A. M. O. Pes; J. O. da Silva, 6 larvae in 80% ethanol.

Zumatrichia sp.

Brazil, Amazonas, Presidente Figueiredo, igarapé dos Veados, Cachoeira Santa Claudia; 02º02'S/60º00'W; 28.ii.2000. A.M.O.Pes; J.O.da Silva, 14 larvae in 80% ethanol.

Bionomy

Species with new genera records for Brazilian Amazonia and for Brazil could not be identified because pharate adults were not collected during the field sampling.

Ceratotrichia sp. immatures were collected, especially in streams located in open areas and having bedrock streambeds. Physical and physico-chemical characteristics of the sampled streams (n = 7) were: width 1.5 to 11 m; discharge 0.37 to 4.74 m^3/s; velocity 0.08 to 1.37 m^3/s; temperature 24 to 25.5º C; pH 4.50 to 7 and electrical conductivity 5.2 to 10.9 µS/cm. Immatures were collected in both turbulent and non-turbulent areas of the streams; however the density was higher in turbulent water (Pes 2001). In some waterfall and rapids *Ceratotrichia* sp. immatures were collected associated with *Zumatrichia* sp., *Alisotrichia* sp. and *Leucotrichia* sp. larvae.

Larvae and pupae of *Alisotrichia* sp. were collected in first and second order streams, in shaded areas, under closed canopy. The pupae were attached to the aquatic vegetation and the larvae were found fixed to the bedrock streambed. *Anchitrichia* sp. larvae were collected only in one stream, in the northern portion of Presidente Figueiredo County (Pes 2001). This stream has higher pH (7) as compared to the other sampled streams.

Zumatrichia sp. larvae were collected on bedrock streambeds, in areas with strong velocity, where the cases are highly abundant, sometimes covering the entire rock surface. Females were observed diving under the water, in the high-velocity area, surrounded by an air bubble, depositing their eggs on the rocks under the water.

Another Leucotrichiini collected in Presidente Figueiredo County was *Leucotrichia* sp. This genus has one species recorded in the upper Rio Negro, Amazonas state, *L. brasiliana* (Sattler & Sykora 1977). In the studied area, *Leucotrichia* sp. larvae and pupae were collected in first-order streams, heavily shaded by the forest, in areas with swift shallow water.

Acknowledgments

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