

First record of *Amanahyphes saguassu* Salles & Molineri (Ephemeroptera: Leptohiphidae) from Colombia and Perú*

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Abstract

In this work, the distribution of *Amanahyphes* genus and *A. saguassu* Salles & Molineri species is expanded through the first records from Colombia and Perú. The departments where these specimens were found belong to the Amazon region of both countries, they are: Amazonas, Guaviare and Vaupés (Colombia); Madre de Dios (Perú). The species identified in this work was previously recorded only in Brazil and Venezuela.

Keywords: Pannota, new records, neotropical region, Amazon region.

Primer registro de *Amanahyphes saguassu* Salles & Molineri (Ephemeroptera: Leptohiphidae) de Colombia y Perú

Resumen

En este trabajo, se amplía la distribución del género *Amanahyphes* y de la especie *A. saguassu* Salles & Molineri, mediante el primer registro para Colombia y Perú. Los departamentos donde se encontraron estos especímenes pertenecen a la región amazónica de ambos países, son: Amazonas, Guaviare y Vaupés (Colombia); Madre de Dios (Perú). La especie identificada en este trabajo, había sido registrada previamente solamente para Brasil y Venezuela.


Palabras claves: Pannota, nuevos registros, región neotropical, región de Amazonas.

Introduction


The genus *Amanahyphes* Salles & Molineri was originally described in Manaus, Amazonas state of Brazil, based on type species *A. saguassu* Salles & Molineri 2006. Later, the distribution of this species was extended to the Brazilian states of Pará, Maranhão, Mato Grosso and Amapá, as well as Bolivar in Venezuela (Belmont *et al.*, 2012, 2015; Cruz *et al.*, 2011; Gonçalves & Da-Silva, 2010; Molineri *et al.*, 2011; Salles & Molineri, 2006; Shimano *et al.*, 2010). Recently, Molineri *et al.* (2015) described *A. bahiensis* in Bahia, a Brazilian state. Thus far, the genus is known to be made up of these two species.

*FR: 17-X-2019. FA: 28-X-2019.


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CÓMO CITAR:

Dias, Núñez-Avellaneda & Flowers. (2021). First record of *Amanahyphes saguassu* Salles & Molineri (Ephemeroptera: Leptohiphidae) from Colombia and Perú. *Boletín Científico. Bol. Cient. Mus. Hist. Nat. U. de Caldas*, 25(2): 61-65. <https://doi.org/10.17151/bccm.2021.25.2.4>



The characteristics that distinguish *Amanahyphes* from all other genera of the Leptohyphidae regarding the male adult are: eyes enlarged and divided into two portions, elongated wings, two segmented forceps arising from posterolateral projections of the styliger plate, and penis with small spines subdistally located on the lateral margin. The nymphs of the genus possess long and slender legs with claws showing two sets of denticles (a marginal row basally and a double submarginal row subdistally), and an atypical shape of operculate gills, proximally narrower, and with an inner margin nearly reaching the midline of the body distally (Salles & Molineri, 2006; Molineri *et al.*, 2015).

In order to increase the knowledge about the Ephemeroptera in Colombia, the following collections were revised: Colección de macroinvertebrados acuáticos de la Amazonia colombiana (COMAC), located at the Instituto de Investigaciones Amazónicas - Sinchi (Leticia) and Colección Entomológica del Programa de Biología de la Universidad de Caldas (CEBUC), Manizales.

Methods

The material of Ephemeroptera of the COMAC and CEBUC Collections was reviewed with stereomicroscopy along with the Peruvian material from the Stroud-FAMU Peru Expedition (Sweeney *et al.* 2020), collected by Wills Flowers. Later, buccal parts and legs of some individuals were mounted for revision in a microscope. Pictures were taken using a Leica M205C stereomicroscope with an attached Leica MC-170HD camera.

For this study, an additional sampling was done in the following streams: Arenosa (located in the municipality of Leticia), Ceima Cachivera and Cucura Cachivera (located in the municipality of Mitú). A distribution map of the genus was drawn considering the locations where the genus was previously registered and the new records (Fig. 1).

The following environmental parameters were measured at each site (Appendix 1): altitude, acidity (pH), temperature (°C), conductivity ($\mu\text{S}\cdot\text{cm}^{-1}$) and dissolved oxygen ($\text{mg}\cdot\text{L}^{-1}$).

Results

A total of 13 nymphs of *Amanahyphes* (Fig. 2) were revised. This is the first record of the genus from Colombia and Perú and the range of distribution was expanded for the Colombian Amazon in the departments of Amazonas, Guaviare and Vaupés and the Peruvian Amazon in the Madre de Dios department (Fig. 1). The available environmental parameters of streams sampled in Colombia are shown in Appendix 1.

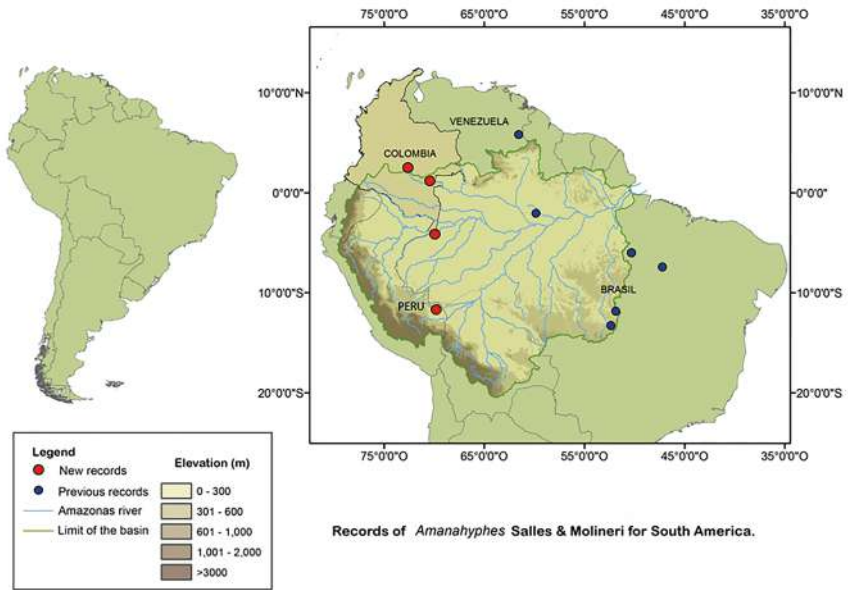


Figure 1. Current distribution of *Amanahyphes* genus.
Source: prepared by the authors



Figure 2. Nymphal habitus: *Amanahyphes saguassu*
Source: Taken by authors

Material examined: Colombia, Amazonas, Leticia: 4 nymphs, La Arenosa stream, 4°07'51.4"S, 69°57'13.7"W, 27/IX/14, Dias, LG; Laython, M and Candre, A (CEBUC). 2 nymphs, Giracairoma stream, 4°06'0.6"S, 69°55'29.4"W, 28/IX/14, idem (CEBUC). Colombia, Guaviare: 1 nymph, Caño La Lindosa, 2°30'24.5"N, 72°38'28.4"W (COMAC). Colombia, Vaupes, Mitú: 2 nymphs, Cucura Cachivera, 1° 09' 39.36" N, 70° 08' 49.05" W, 03/III/2018 Dias, LG; Bacca, T. and Toro, B. (CEBUC). 4 nymphs, Ceima Cachivera, 1° 13' 23.16" N, 70° 09' 43.68" W, 28/II/2018, Dias, LG; Bacca, T. and. Toro, B. (CEBUC). Perú, Madre de Dios: 1 nymph, Centro de Investigación y Capacitación Río Los Amigos (CICRA), Maquisapa stream, 12°32'05.3"S, 70°07'08.0"W, 23/VIII/2006, Flowers, RW; Funk, D; Sweeney, B.

Discussion

The individuals found in this study belong to the species *A. saguassu* and have the characteristics described by Salles & Molineri (2006). We found some variation in the number of marginal denticles of the hind legs (6-8 marginal denticles), in relation to the original description of the species, where they found 4-6 marginal denticles.

The environmental parameters found in the sampled streams where this species lives are characteristic of Amazonian rivers: pH, dissolved oxygen and conductivity relatively low, and high temperature (Pascoaloto, 2001).

This new records highlight the importance of conducting new research studies of aquatic insects in the different Amazonian departments of Colombia and Perú, which are still largely unexplored.

Acknowledgements

We thank the Universidad de Caldas for the economic support for the collections review and Transmazonic Aquatic Insects project. We are thankful to Dr. Santiago Roberto Duque Escobar of the Universidad Nacional - Leticia Branch, for the logistic support in field and Diego Martínez for helping with the map. To MSc. Marco Laython, Adrian Candre, D. Funk and B., Dr. Tito Bacca, Dr. Beatriz Toro, Sweeney for helping in the field work.

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Appendix 1. The environmental parameters of streams sampled.

Stream	Altitude (m)	pH	Temperature (°C)	Conductivity (µS.cm-1)	Dissolved oxygen (mg.L-1)
Quebrada Arenosa	85m	6.33	25.5	26	5.22
Quebrada Giracairona	90m	5.32	24.7	19.3	6.11
Caño La Lindosa	207m	5.30	24	6.8	8.46
Quebrada Ceima Cachivera	184m	6.15	25.4	5.5	6.59
Caño Cucura	207	6.17	26.6	11.46	5.95
Maquisapa	270	-	-	-	-