



# First Record of the Genus *Trochiliphagus* Carriker 1960 (Amblycera: Ricinidae) Infesting a Hummingbird from Brazil

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## Abstract

Four genera and at least fifty species of chewing lice have been recorded infesting hummingbirds (Trochilidae). Here, we record for the first time, the genus *Trochiliphagus* in Brazil, as well as, a new host record for *Trochiliphagus mellivorus* Carriker, the fork-tailed woodnymph, *Thalurania furcata*.

**Keywords** Chewing lice · Ectoparasites · Hummingbirds · New record · Brazil

## Introduction

Birds that belong to the family Trochilidae Vigors, 1825 (Aves: Apodiformes), are popularly known as “hummingbirds” and have approximately 373 valid species distributed throughout the Nearctic and Neotropical Regions (IUCN 2023). These birds are hosts for several groups of ectoparasites, including mites (Acari: Ixodida, Mesostigmata, Trombidiformes, and Sarcoptiformes) and chewing lice (Phthiraptera: Amblycera) (Carriker 1960; Proctor and Owens 2000; Hernandez et al. 2016; Bassini-Silva et al. 2021).

Four genera have been recorded associated with hummingbirds, *Leremenopon* Dalglish and Price, 2003 and *Myrsidea* Waterston, 1915 (Menoponidae Mjöberg, 1910), and *Trochiloecetes* Paine & Mann, 1913 and *Trochiliphagus* Carriker, 1960 (Ricinidae Neumann, 1890) (Carriker 1960; Price et al. 2003; Dalglish and Price 2003).

Of these, only three species of the genus *Trochiloecetes* have been recorded parasitizing hummingbirds in Brazil, *Trochiloecetes emeliae* Paine & Mann, 1913, *Trochiloecetes naevius* Oniki & Emerson, 1982, *Trochiloecetes rupununi* Carriker, 1962 (Paine and Mann, 1913; Carriker 1962; Oniki and Emerson 1982).

In the present study, we are recording for the first time, a species of *Trochiliphagus* infesting a hummingbird in Brazil and providing microscopy images for the species to help in future identifications.

## Materials and Methods

An adult female Fork-tailed Woodnymph, *Thalurania furcata* (Gmelin, 1788) (Caprimulgiformes: Trochilidae), was found dead in the city of Piedade, São Paulo State, Brazil, by a civilian and taken to a veterinarian for further examination. The hummingbird was identified morphologically following Grantsau (1988). During the physical examination of the feathers, some chewing lice were observed and preserved in 70% ethanol for future identification.

Specimens were sent to the Laboratório de Coleções Zoológicas, Instituto Butantan, São Paulo, and

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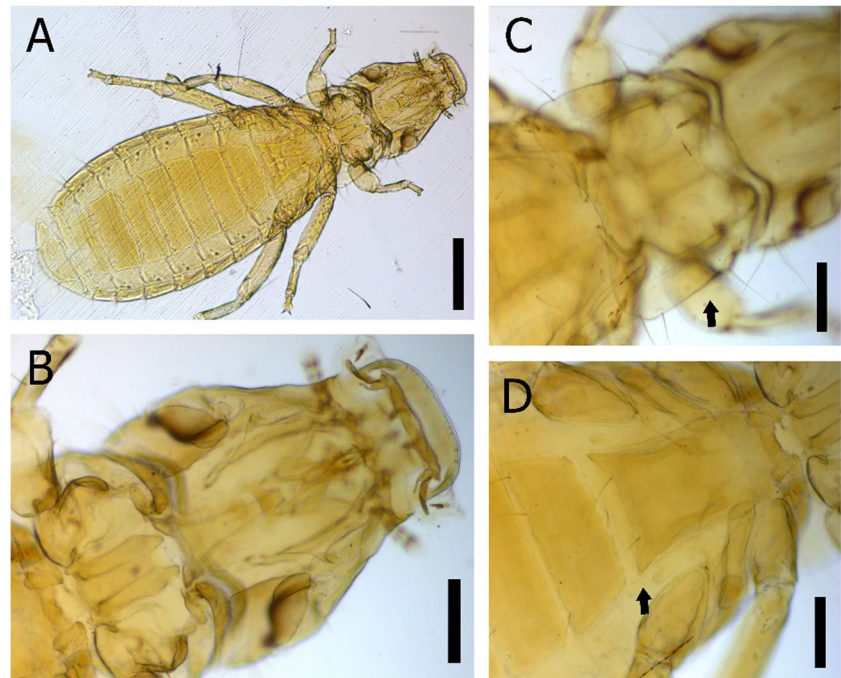
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**Fig. 1** Light microscopy images of the female of *Trochiliphagus mellivorus* Carriker, 1960. **A** general ventral view; **B** head; **C** thorax; **D** sternal shield bell shaped. The black arrows highlight the straight lateral margin and the downward-facing angles. Scale bars: **A** 500  $\mu\text{m}$ , **B–D** 200  $\mu\text{m}$



slide-mounted with Hoyer's medium. Females were identified to genus based on Price et al. (2003) and to species based on Carriker (1960). Chewing lice were deposited in the Entomological Collection of the Instituto Butantan (IBSP), São Paulo municipality, São Paulo state, Brazil, under the accession number IBSP-Ent 14,966. Images were taken using a Leica DFC 500 digital camera coupled to a Leica DM4000B optical microscope. Extended focal range images were composed using Leica Application Suite version 2.5.0. Figures were prepared using Adobe Photoshop v. 13.0.

## Results

All specimens collected (four females and two nymphs) from the Fork-tailed Woodnymph were identified as *Trochiliphagus mellivorus* Carriker, 1960 (Fig. 1A). Following the description by Carriker (1960), this species is part of the “group B” into the genus *Trochiliphagus*, whose species are distinguished by having the body size varying between 3 and 3.40 mm, and our specimens (females) ranged from 3.01 to 3.25 mm.

Besides that, this lice species can be distinguished from the other species of the genus by having a convex flattened forehead (Fig. 1B), a lateral of the thorax's anterior region straight (Fig. 1C), and a bell-shaped sternal shield with angularly sharp apexes of posterior region pointed downwards (Fig. 1D).

## Discussion

It is important to mention that Rheinwald (2007) synonymized *Trochiliphagus* with *Ricinus* de Geer, 1778. However, synonymy is not generally accepted (Oniki-Willis et al. 2023; Price et al. 2003) due to the fact that *Trochiliphagus* can also be differentiated from *Ricinus* by the modified piercing mouthparts (mandibles and sucking apparatus) that enable them to pierce the skin and consume blood from their hosts (Carriker 1960).

There are 13 valid species, and here, we record for the first time, *T. mellivorus* and, by consequence, the genus *Trochiliphagus* in Brazil. This species was described and only recorded parasitizing the white-necked jacobin, *Florisuga mellivora* (L., 1758) (Apodiformes: Trochilidae) in Huanay, Río Bópi, Bolivia (Carriker 1960). It is essential to mention that the distribution of the host (*T. furcata*), overlaps the distribution of the type host (*F. mellivora*), suggesting that this species has a slightly more generalist habit, feeding on at least two different species of hummingbirds.

Given the diversity of hummingbirds and the extensive Brazilian territory, this is only the initial step in studying their chewing lice. Much effort is needed to understand the biodiversity and ecological dynamics of these birds and their respective ectoparasites.

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**Author contribution** All authors contributed to the conception and design of this study. RB-S, IPP, DMB-B, and FCJ confirmed the

identification of the lice. IPP and FCJ made the field observations, collected samples, and helped in writing the methodology. RB-S wrote the first draft of the manuscript and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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## Declarations

**Conflict of Interest** The authors declare no competing interests.

## References

- Bassini-Silva R, Takatsu JC, Peinado LC, Faxina C, Moreira-Lima L, Fischer E, Hingst-Zaher E, Santos JC, Moraes GJ, Dowling APG, Barros-Battesti DM, Jacinavicius FC (2021) Mites (Mesostigmata: Melicharidae) associated with hummingbirds (Aves: Trochilidae) in Brazil. *Int J Acarol* 47:8:714–718. <https://doi.org/10.1080/01647954.2021.1980613>
- Carriker MA (1960) Studies in Neotropical Mallophaga, XVII: a new family (Trochiliphagidae) and a new genus of the lice of hummingbirds. *Proc United States Natl Mus* 112:307–342
- Carriker MA (1962) On some Mallophaga from Trinidad, W.I. and British Guiana in the collections of the British Museum (Natural History). *Ann Mag Nat Hist* 5:56:449–483
- Dalgleish RC, Price RD (2003) A new genus and four new species of chewing lice (Phthiraptera: Amblycera: Menoponidae) from hummingbirds (Apodiformes: Trochilidae). *Occas Pap West Found Vertebr Zool* 7:1–9
- Grantsau R (1988) Os beija-flores do Brasil. Rio de Janeiro, Ed. Expressão Cultura, 233p
- Hernandes FA, Pedroso LGA, Oniki-Willis Y (2016) Five new feather mites of the subfamily Pterodectinae (Acariformes: Astigmata: Proctophylloidae) from passerines and hummingbirds (Aves) of Brazil. *Zootaxa* 4161(3):301–328
- IUCN (2023) The IUCN Red List of Threatened Species. Version 2022-2. Accessed 20-September-2023. <https://www.iucnredlist.org>
- Oniki Y, Emerson KC (1982) A new species of *Trochiloecetes* (Mallophaga: Ricinidae) from the saw-billed hermit, *Ramphodon naevius* (Dumont) (Apodiformes: Trochilidae). *Rev Brasil Biol* 42(1):85–87
- Oniki-Willis Y, Willis EO, Lopes LE, Rózsa L (2023) Museum-based research on the lice (Insecta: Phthiraptera) infestations of hummingbirds (Aves: Trochilidae)—Prevalence, genus richness and parasite associations. *Diversity* 15(1):54. <https://doi.org/10.3390/d15010054>
- Paine JH, Mann WM (1913) Mallophaga from Brazilian Birds *Psyche* (Camb Mass) 20:15–23
- Price RD, Hellenthal RA, Palma RL (2003) World checklist of chewing lice with host associations and keys to families and genera. In: Price RD, Hellenthal RA, Palma RL, Johnson KP, Clayton DH (eds). *The chewing lice: world checklist and biological overview*. Illinois Nat Hist Surv Spec, IL, USA, 24, pp. 1–448
- Proctor H, Owens II (2000) Mites and birds: diversity, parasitism and coevolution. *Trends Ecol Evol* 15(9):358–364
- Rheinwald G (2007) The position of *Trochiliphagus* Carriker within the Ricinidae (Insecta: Phthiraptera). *Bonn Zool Beiträge* 55:37–46

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