

First record of *Cebidicola semiarmatus* (Phthiraptera: Trichodectidae) on the red howler monkey, *Alouatta guariba clamintans* (Primate: Atelidae) in Brazil

Primer registro de *Cebidicola semiarmatus* (Phthiraptera: Trichodectidae) en el mono aullador rojo, *Alouatta guariba clamintans* (Primates: Atelidae) en Brasil

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Abstract: Lice are highly specialized parasites that spend their entire life cycle on their host. Thus, a particular species of chewing lice is often restricted either to a single host species or to a phylogenetically related species. About 560 species of these insects parasitize mammals exclusively. *Cebidicola semiarmatus* is one of these species, known to parasitize several primate species of the genus *Alouatta*. This paper presents the first record of *C. semiarmatus* parasitizing *A. guariba clamintans*.

Key words: Ectoparasites, wildlife, insects, mammals.

Resumen: Los piojos son parásitos especializados que desarrollan todo su ciclo de vida en el hospedador. Por esta razón, muchas veces una determinada especie de piojo masticador es específica de una especie de hospedador o de otras filogenéticamente cercanas próximas. Alrededor de 560 especies de piojos parasitan exclusivamente mamíferos. *Cebidicola semiarmatus*, es una de ellas, caracterizada por parasitar primates del género *Alouatta*. Este trabajo constituye el primer registro de *C. semiarmatus* parasitando *A. guariba clamintans*.

Palabras clave: Ectoparásitos, fauna silvestre, insectos, mamíferos.

Introduction

The fauna of chewing lice parasitizing primates of the genus *Alouatta* Lacépède, 1799 in Brazil has not been properly studied since Werneck's late works (1950), in which some species of lice, as well as associations between parasites and hosts, were described. Thus, this report makes a contribution to knowledge regarding parasites likely to occur in *Alouatta guariba clamintans* Cabrera, 1940.

Lice (Phthiraptera) are highly specialized parasitic insects, with generally high specificity, unlike most other ectoparasite insects (Marshall 1981). They include bloodsucking species (Suborder Anoplura, restricted to mammals) and chewing species (Suborders Amblycera, Ischnocera and Rhyncophthirina, parasitizing birds and/or mammals). Because they spend their entire life cycle on the host, a particular species of chewing louse is often restricted to a certain host species or to a phylogenetically related species (Barker 1994; Johnson and Clayton 2003). There are about 5,000 known species of lice, and among these about 560 are specific parasites of mammals (Price *et al.* 2003). *Cebidicola semiarmatus* (Neuman, 1913) is one of these species, having been found parasitizing *Alouatta caraya* (Humboldt, 1812), *A. belzebul* (Linnaeus, 1766), and *A. seniculus ursina* (Linnaeus, 1766) (Werneck 1950), popularly known as the black howler monkey, and red howler monkey and brown howler monkey, respectively (Bicca-Marques *et al.* 2006).

Alouatta guariba clamintans, popularly known as the red-handed howler monkey, is widely found throughout the Atlantic Forest (Bicca-Marques *et al.* 2006). The presence of parasites on *Alouatta* is common, as they are an ecological mediator, able to regulate populations due to the clinical and/ or sub-clinical manifestation of diseases, as well as mortality as a consequence in some of these animals (Freeland 1976). Endoparasites of howler monkeys are well studied (Stuart *et al.* 1998), and the contrary happens regarding chewing lice. Knowledge about these interactions is of paramount importance for understanding many ecological aspects of these animals. This report presents the first record of *C. semiarmatus* parasitism in *A. g. clamintans*.

Materials and methods

Lice specimens were obtained in July 2015 from a howler monkey that was a victim of tramping, in the city of Matias Barbosa, state of Minas Gerais, Brazil (21°52'S 43°19'W). The howler monkey examined was a female, belonging to the *A. g. clamintans* subspecies, according to Gregorin (2006). It was brought to the Wild Animal Screening Center (CETAS, Portuguese acronym) located at the headquarters of the Brazilian Environmental Institute (IBAMA, Portuguese acronym) in the city of Juiz de Fora, Minas Gerais. The primate was visually examined for the presence of ectoparasites. Since the presence of lice was noticed, they were collected

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with tweezers, packed in bottles containing 70° ethanol and then forwarded to the Laboratory of Parasite Arthropods of Federal University of Juiz de Fora. These insects were mounted on permanent slides, according to adaptations to the technique proposed by Palma (1978). Lice were then identified through appropriate keys (Werneck 1950; Price *et al.* 2003), and deposited in the laboratory's collection.

Results and discussion

Thirty lice *C. semiarmatus* (Fig. 1) were found, among them eleven females (Fig. 1A), five males (Fig. 1B) and fourteen nymphs. Nits were found on the host's head and forelegs. Lice were distributed throughout the belly, back and head. The proposition of new associations between lice and host is a controversial subject in the Phthiraptera order, given the particularities they present (Valim *et al.* 2005). However, this is the first record of *C. semiarmatus* parasitism in *A. g. clamitans*.

According to Kethley and Johnston (1975), parasites can be transferred between hosts. Thus, a louse can parasitize a second host presenting similar conditions as the first one. Therefore, this association can be explained by the fact that *A. g. clamitans* and *A. caraya* are able to generate hybrid individuals (Jesus *et al.* 2010), thereby being considered closely related species from the phylogenetic point of view. In addition, *A. g. clamitans*, *A. caraya* and *A. belzebul* have similar characteristics, such as body size and hair thickness; however, fur morphology is different, as is the distribution of scales on the cuticle and

the cell shape in the marrow (Ingberman and Monteiro-Filho 2006). These are some of the mechanisms which may define the specificity of mammal lice (Reed *et al.* 2000). Therefore, it is possible that *A. g. clamitans* has favorable characteristics for parasitism by *C. semiarmatus* and the internal and external morphology of the fur does not interfere directly in the parasite specificity mechanism, with thickness having the only influence.

According to Taylor and Purvis (2003), Trichodectidae family lice and mammals do not show a co-speciation process. However, according to those authors, there may still be unknown factors exerting influence on the co-speciation process. A direct effort is needed to research Phthiraptera fauna in primates, since the comprehension of this group might assist in health management measures, as well as to elucidate aspects concerning to the phylogenetic of these animals.

Acknowledgements

We thank Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for funding.

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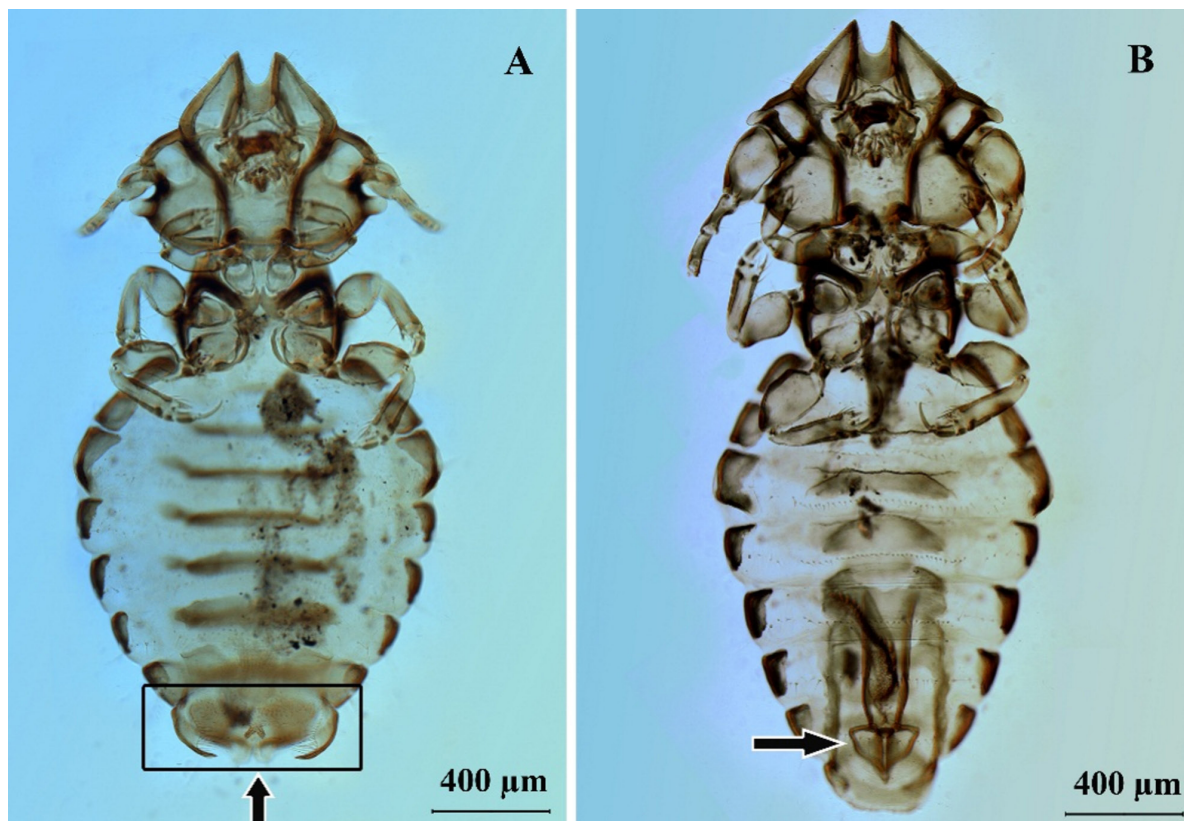


Figure 1. Specimens of *Cebidicola semiarmatus*. A. Female, highlighting the last tergite of subgenital plate, with numerous small setae. B. Male, highlighting the posterior portion of the reproductive tract.

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Received: 24-Sep-2016 • Accepted: 22-Sep-2017

Suggested citation:

NASCIMENTO, R. M.; MATURANO, R.; OLIVEIRA, M. de; DAEMON, E. 2018. First record of *Cebidicola semiarmatus* (Phthiraptera: Trichodectidae) on the red howler monkey, *Alouatta guariba clamitans* (Primate: Atelidae) in Brazil. *Revista Colombiana de Entomologia* 44 (1): 129-131. Enero - Junio 2018.