

A new record of pinworm *Trypanoxyuris minutus* parasitism in Southern Brown Howler Monkeys *Alouatta guariba clamitans* in Southern Brazil

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ABSTRACT

Alouatta guariba clamitans, primates belonging to the Atelidae family, popularly known as southern brown howler monkeys, are always subject to parasite infection. *Trypanoxyuris minutus* is important in this regard, comprising a nematode with the capacity to harm this primate species, potentially resulting in death in more severe cases. In this context, this study reports the encounter of an *A. guariba clamitans* specimen in a highway close to the urban area of the municipality of Curitibaanos, state of Santa Catarina, southern Brazil, whose large intestine contained about 1,000 *T. minutus* specimens. Despite an unidentified cause of death of the assessed primate, this case indicates that further surveillance and monitoring efforts are merited to investigate. This to verify the cause of death of any other *A. guariba clamitans* specimens that may be found, considering that such high levels of parasitic infestation may weaken primate health, making these animals more susceptible to other infections, such as yellow fever.

Keywords: Oxyuridae; Primates; southern Brazil; state of Santa Catarina.

Novo registro de parasitismo de *Trypanoxyuris minutus* em *Alouatta guariba clamitans* no sul do Brasil

RESUMO

Espécimes de *Alouatta guariba clamitans* são primatas pertencentes à família Atelidae, conhecidos popularmente por bugio-ruivo, que estão sempre sujeitos à infecção por parasitos. Um grupo bastante importante de parasitos trata-se do *Trypanoxyuris minutus*, um nematoide que pode causar prejuízos à saúde deste primata, sendo possível até causar sua morte em casos mais graves. No presente estudo relatamos o encontro de um exemplar de *A. guariba clamitans* em área de rodovia próxima à área urbana do município de Curitibaanos, estado de Santa Catarina, sul do Brasil. O intestino grosso do exemplar de *A. guariba clamitans* possuía em seu interior cerca de 1000 de exemplares de *T. minutus*. Apesar de não se ter o conhecimento da real causa da morte desse primata, trata-se de um caso que merece vigilância e acompanhamento. Isto para verificar a causa da morte de outros exemplares que possam vir a ser encontrados, tendo em vista que o alto nível de infestação parasitária pode debilitar a saúde do primata, tornando-o mais suscetível a outras infecções, como é o caso da febre amarela.

Palavras-chave: Oxyuridae, Primates, sul do Brasil, estado de Santa Catarina.

New world non-human primates are parasitized by several helminth species, including members belonging to the Oxyuridae family, comprising 22 species (STUART et al., 1998; GARCÍA et al., 2018). The genus *Trypanoxyuris* belongs to the subfamily Enterobiini. One noteworthy Oxyuridae species is *Trypanoxyuris minutus*, which exclusively parasitizes the cecum and large intestine of primates belonging to the genus *Alouatta*, whose infection occurs by ingesting eggs (HUGOT et al., 1996; STUART et al., 1998; BARBOSA et al., 2017). It causes host anus irritation and itching, as well as mucosa scarification, leading to loss of host blood and proteins, which can, in turn, lead to weight loss, diarrhea and, in severe cases, death (TOFT, 1982). Due to the problem surrounding this parasitic relationship, the aim of this scientific note was to report the finding of *T. minutus* specimens in an *Alouatta guariba clamitans* (howler monkey) individual, categorized as vulnerable both in Brazil and worldwide (BICCA-MARQUES et al., 2018; BUSS et al., 2021).

A female *A. guariba clamitans* weighing 4.800g was received by the campus Curitibaanos Pathology department at the Federal University of Santa Catarina (LABOPAVE/UFSC). The specimen was originally found in a highway close to the urban area of the municipality of Curitibaanos (Figure 1), located in the plateau region of the state of Santa Catarina, southern Brazil, surrounding by crops, and some portions of forested areas. The primate's intestine was filled with *T. minutus*, about 1000 specimens. The parasites were sampled from the primate intestine lumen, processed, identified and fixed in 10% formaldehyde.

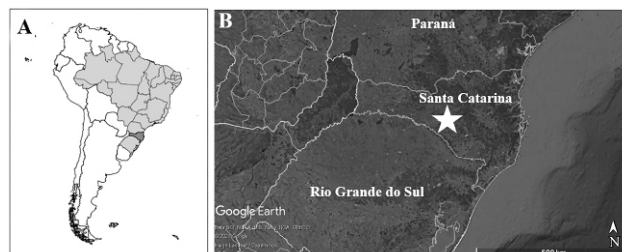


Figure 1. English: Location of the municipality of Curitibaanos, state of Santa Catarina, southern Brazil. Portuguese: Local do município de Curitibaanos, estado de Santa Catarina, sul do Brasil.

The LABOPAVE/UFSC pathological report indicated no specific changes and/or injuries due to the severe parasite infestation. However, it is emphasized that, as in the case for any parasite, high infestations can cause significant effects, which, as mentioned previously, can lead to death (e.g. AMATO et al., 2002).

Other cases concerning *A. guariba clamitans* individuals parasitized by *T. minutus* have been described in the Brazilian states of Rio de Janeiro, Minas Gerais, Rio Grande do Sul as well as Santa Catarina (AMATO et al., 2002; SOUZA et al., 2010; BARBOSA et al., 2017; PEREIRA et al., 2020). Reports on this parasite-host relationship, however, are scarce, indicating the importance of better understanding the distribution of *T. minutus* nematodes and their relationship with howler monkeys.

Although few records concerning *T. minutus* in Brazil are available, underreporting is likely, as *A. guariba clamitans* is found only in the eastern portion of the country, mainly in

Atlantic Rainforest areas in the states of Espírito Santo, Rio de Janeiro, Minas Gerais, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul. Concerning these last three states, *A. guariba clamitans* is widely distributed in mixed rainforest areas (ICMBio/MMA, 2018).

Due to their group habits, these primates become very vulnerable to parasitic infestations, mainly due to intentional fecal ingestion and consequent parasitic egg intake (STONER et al., 1996). Another factor concerning parasite transmission comprises increasing deforestation rates, which are occurring very rapidly in Brazil, due to forest fires and clearing for the creation of pasture areas. *A. guariba clamitans* is successful in its survival because it subsists even in deforested areas, feeding on leaves in areas comprising about 2 ha, rarely moving 1 kilometer per day (BICCA-MARQUES, 2003; MUHLE, 2008; RIBEIRO; BICCA-MARQUES, 2005; PRATES, 2007). Because of this low habitat, it is unusual to find howler monkeys run over on roads (NEVES; RYLANDS, 1991; CROCKETT, 1998; BICCA-MARQUES, 2003). In this regard, it is suggested that small to medium forest fragment maintenance and also not so much impacted may be important for howler monkey conservation (REIS et al., 2006; ALMEIDA; SILVA et al., 2017).

Trypanoxyuris minutus parasitism can result in considerable problems for *A. guariba clamitans* populations, due to potential longevity and population structure implications, as howler monkeys are categorized as vulnerable. Thus, constant monitoring efforts are required in order to better understand the host-parasite relationship reported herein and how it affects howler monkey populations. Something to be considered and that has worked well are canopy bridges that had already been recorded with this primate using it (TEIXEIRA et al., 2013).

It is also interesting to note that the close evolutionary history between non-human primates and humans could, in hypothesis, result in cross-infection (CONGA et al., 2015). The close relationship between humans and other primates means that their parasite are also similar and the possibility of cross-infection makes the identification of new species relevant to human medicine. This indicates an additional reason for monitoring these endoparasites and their hosts. It is noteworthy that this primate is linked to deaths due to yellow fever, thus reinforcing the importance of further understanding the distribution and biology of this species (FERREGUETTI et al., 2020).

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