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First record of *Trypanosoma* sp. (Protozoa: Kinetoplastida) in tuvira (*Gymnotus* aff. *inaequilabiatus*) in the Pantanal wetland, Mato Grosso do Sul State, Brazil

Primeiro registro de *Trypanosoma* sp. (Protozoa: Kinetoplastida) em tuvira (*Gymnotus* aff. *inaequilabiatus*) no Pantanal, Mato Grosso do Sul, Brasil

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Abstract

The blood infection by *Trypanosoma* sp. in tuvira (*Gymnotus* aff. *inaequilabiatus*) from the Pantanal wetland was reported in this study. Ten fish from the Paraguay River in the Pantanal were evaluated for the presence of hemoflagellates. Trypomastigotes of *Trypanosoma* sp. were observed in blood smears from three fish (30% prevalence) and some forms were seen to be undergoing division. Using the diagnostic methods of fresh examination and blood centrifugation in hematocrit capillary tubes, the prevalence rate was 80%. This is the first report of *Trypanosoma* sp. in tuvira in Brazil.

Keywords: Hemoflagellate, hemoprotozoa, live bait.

Resumo

O objetivo do presente estudo foi reportar a infecção por *Trypanosoma* sp. em tuviras (*Gymnotus* aff. *inaequilabiatus*) oriundas do Pantanal Sul-mato-grossense, Brasil. Dez peixes provenientes do rio Paraguai, Pantanal Sul-mato-grossense, foram avaliados quanto à presença de hemoflagelados. Tripomastigotas de *Trypanosoma* sp. foram observados nas extensões sanguíneas de três peixes (30% de prevalência), e algumas formas encontravam-se em divisão. Por meio do exame a fresco e da centrifugação do sangue em capilar de hematócrito como métodos para diagnóstico, a taxa de prevalência foi de 80%. Esse é o primeiro relato de *Trypanosoma* sp. em tuviras no Brasil.

Palavras-chave: Hemoflagelado, hemoprotozoário, isca viva.

Introduction

Trypanosomes are kinetoplastid protozoa that cause blood infection in many species of fish worldwide, including both freshwater species (FIGUEROA et al., 1999; SMIT et al., 2004; GU et al., 2007; KONAS et al., 2010) and marine species (SAUNDERS, 1959; OVERATH et al., 1999; KARLSBAKK, 2004; BURRESON, 2007). Transmission of these hemoflagellates between fish has been attributed to different species of leeches. The leech *Hemiclepsis marginata* is responsible for transmission of *T. carassii* among European carp (OVERATH et al., 1999). In Canada, *Actinobdella inequiannullata* is the most abundant leech species

and is the specific vector of *T. catostomi* for *Catostomus commersoni* (JONES; WOO 1992). The main vector of trypanosomiasis in fish belonging to the family Loricariidae in Brazil is the leech *Batrachobdella gemmata* (D'AGOSTO; SERRA-FREIRE 1993).

The tuvira (*Gymnotus* aff. *inaequilabiatus*) (Teleostei: Gymnotidae) is a knife-fish native species in the Pantanal basin that inhabits lentic environments, with turbid water and aquatic vegetation that is rich in organic matter coming from the flooding process. This species has economic importance because of its use as live bait, driven by the demand for sport fishing in the Pantanal, such as for the dourado (*Salminus brasiliensis*) and for two catfish species: pintado (*Pseudoplatystoma corruscans*) and cachara (*Pseudoplatystoma reticulatum*). However, constant exploitation has caused its numbers to diminish in its natural environment (MORAES; ESPINOSA, 2001). Production in captivity may be

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an economic alternative for riverbank peoples, and it may diminish the capture pressure on the natural environment. However, lack of information about health issues relating to tuvira has limited their rearing.

The aim of the present study was to report the blood infection by *Trypanosoma* sp. in tuvira (*G. aff. inaequilabiatus*) from the Pantanal wetland, Mato Grosso do Sul State, Brazil.

Material and Methods

Tuvira specimens that had been caught by bait gatherers in the Paraguay river (18° 04' 15,00" S and 57° 28' 17,00" W), in the Pantanal, and had been put on the market in the Corumbá city, were acquired and transported to the Fish-farming Laboratory of Embrapa Western Region Agriculture, located in the Dourados, Mato Grosso do Sul State. The fish were kept in round fiberglass tanks with 1000 L of capacity, which were supplied with a continuous flow of water coming from an artesian well (10 L.min⁻¹).

To diagnose the presence of hemoflagellates, ten fish specimens were subjected to venous puncture of the caudal vein, to collect blood. Blood smears on slides were produced in duplicate and stained panchromatically with the May Grünwald-Giemsa-Wright combination, and were then evaluated under an optical photomicroscope (Nikon® E200, Japan). Fresh blood between a slide and a coverslip was also examined, by means of phase contrast microscopy (Nikon® E200, Japan). The same procedure

was used for observations after centrifugation of blood samples in hematocrit capillary tubes, just above the white blood cell layer (WOO, 1969).

Results and Discussion

Trypomastigotes of *Trypanosoma* sp. were observed in the blood smears from three fish (30%) (Figure 1a, b), and some of them were found to be undergoing division (Figure 1d). From evaluating both the fresh samples and the results from centrifugation of blood samples in hematocrit capillary tubes, from the same fish specimens, the prevalence rate was found to be 80% (Figure 1c, d). This characterized the most efficient method for diagnosis.

The prevalence rate of these blood parasites is generally high in fish from the natural environment (OVERATH et al., 1999; SMIT et al., 2004; KONAS et al., 2010). This is possibly related to the immunity mechanisms of the fish against infections. Overath et al. (1999) stated that the immune response of non-mammalian vertebrates is of limited efficacy and/or these parasites evade or manipulate the immune response of their respective hosts.

Multiplication of these hemoflagellates in blood tissue has been described in some vertebrate hosts (PATERSON; WOO, 1984; BURRESON; KARLSBAKK, 2007). This division may be an adaptive mechanism, if the pathogenicity of these trypanosomes for their hosts is dependent on the intensity of the parasitemia (BURRESON; KARLSBAKK, 2007).

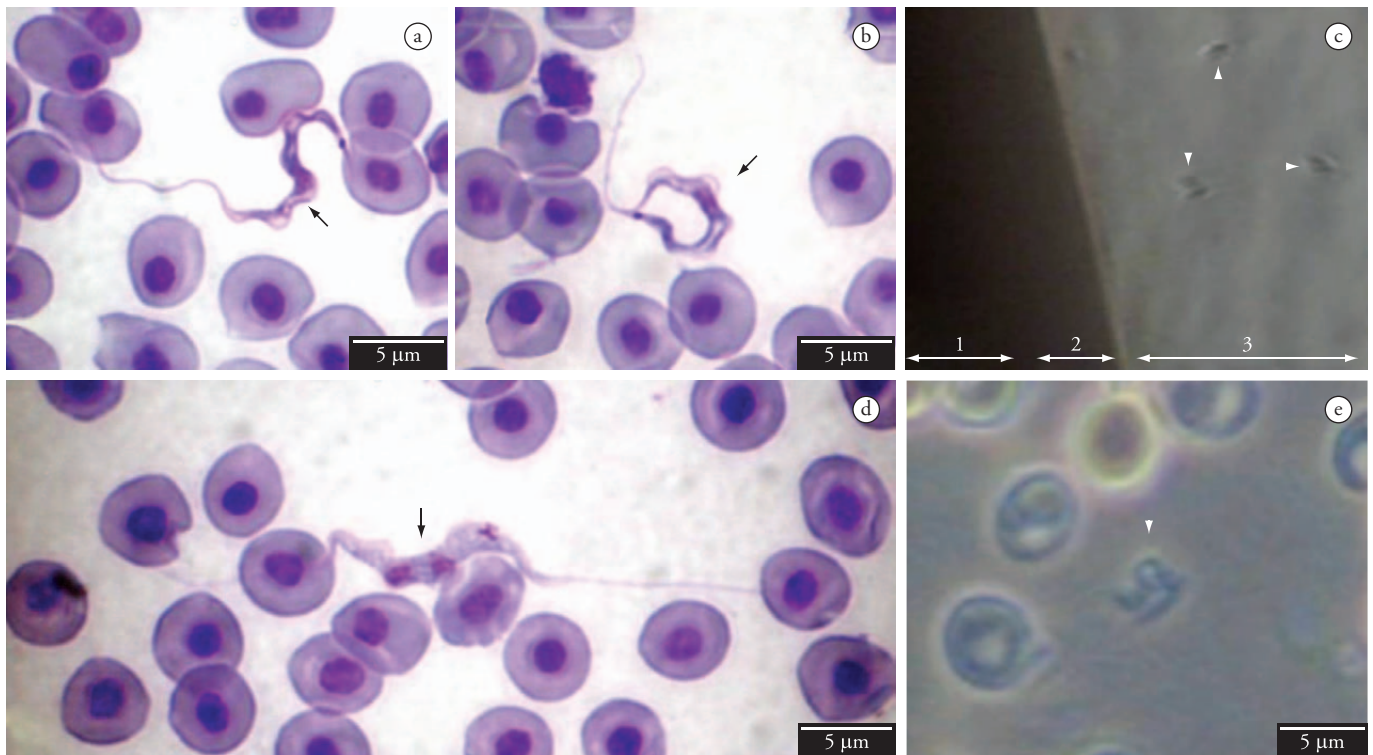


Figure 1. *Trypanosoma* sp. in the circulating blood of tuvira (*Gymnotus aff. inaequilabiatus*) from the Pantanal wetland, State of Mato Grosso do Sul. Trypomastigotes (a-b) and stage undergoing division (d). May-Grünwald-Giemsa-Wright staining, bar = 5 µm. Trypomastigotes observed after centrifugation of blood in a capillary tube (c – 1: red blood cells; 2: white blood cell paste; 3: plasma). Magnification 100×. *Trypanosoma* observed through direct examination by means of phase contrast microscopy (e). Bar = 5 µm.

Conclusion

This is the first report of *Trypanosoma* sp. in tuvira in Brazil. Additional studies need to be conducted in order to identify this parasite systematically and molecularly, and to identify its biological cycle, pathogenicity and impact on tuvira populations in the natural environment and on populations reared by bait gatherers.

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