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Research Note

First report of *Strongyloides* sp. (Nematoda, Strongyloididae) in *Leopardus tigrinus* (Carnivora: Felidae) in the municipality of Botucatu, State of São Paulo, Brazil

Primeiro relato de *Strongyloides* sp. (Nematoda, Strongyloididae) em *Leopardus tigrinus* (Carnivora: Felidae) do município de Botucatu, Estado de São Paulo, Brasil

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Abstract

The present study reports the first case of infection by *Strongyloides* sp. in *Leopardus tigrinus* in the municipality of Botucatu, State of São Paulo, Brazil. Feces of the infected *L. tigrinus* specimen were cultivated in sterilized equine feces and a cat (*Felis catus domesticus*) was experimentally infected with three thousand infective L_3 subcutaneous route, in order to identify the *Strongyloides* species involved in the parasitism. Parthenogenetic females recovered from the experimental animals were analyzed but comparison between the biometric data found and the data in the literature did not enable identification of the species. This is the first report on the occurrence of *Strongyloides* sp. in *L. tigrinus*.

Keywords: *Leopardus tigrinus*, wild felids, parasitic infection, disease, new host.

Resumo

O presente estudo reporta o primeiro caso de infecção por *Strongyloides* sp. em *Leopardus tigrinus* no município de Botucatu, Estado de São Paulo, Brasil. Fezes do exemplar parasitado de *L. tigrinus* foram cultivadas em fezes eqüinas esterilizadas e foi realizada infecção experimental em gato (*Felis catus domesticus*) com três mil larvas L_3 infectantes por via subcutânea, para a identificação da espécie de *Strongyloides* envolvida no parasitismo. As fêmeas partenogenéticas obtidas do animal experimental foram analisadas porém a comparação dos dados biométricos encontrados com os dados da literatura não permitiu a identificação da espécie. Este é o primeiro relato sobre a ocorrência de *Strongyloides* sp. Em *L. tigrinus*

Palavras-chave: *Leopardus tigrinus*, felídeos selvagens, infecção parasitária, doença, novo hospedeiro.

The genus *Strongyloides* includes 52 parasite species that infect numerous vertebrates, such as snakes, felids, canids and ruminants (DORRIS et al., 2002). In Brazil, several *Strongyloides* species have been reported, infecting a wide diversity of hosts. These include *S. chapini*, *S. ferreirai*, *S. fuelleborni*, *S. myopotami*, *S. papillosus*, *S. ransomi*, *S. ratti*, *S. stercoralis*, *S. vezezuelensis* and *S. westeri*, which were found in mammals (VICENTE et al., 1997).

Strongyloides spp. have been described worldwide in felids. There are reports of *S. planiceps* in tigers in Malaysia and in domestic cats in Japan; *S. felis* in domestic cats in Calcutta, India, and in Australia; and *S. tumefaciens* in domestic cats in the USA (Louisiana, Florida, Texas and Georgia) and in *Felis chaus* (jungle cat) in India, *Felis rufus* (bobcat) and *Felis concolor coryi* (Florida panther) in Florida (BOWMAN et al., 2002). In Brazil, *S. stercoralis* has also been found in domestic cats (*Felis catus domesticus*) (VICENTE et al., 1997). However, there are no reports on the occurrence of *Strongyloides* spp. in the little spotted cat (*Leopardus tigrinus*).

The aim of this study was to report the first case of *Strongyloides* sp. in this felid species.

In the municipality of Botucatu, State of São Paulo, Brazil, a male of the species *L. tigrinus* was cared for at the Veterinary Hospital, Faculdade de Medicina Veterinária e Zootecnia, Universidade

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Estadual Paulista Julio de Mesquita Filho, Botucatu, after it was run over by a motor vehicle. Coproparasitological examinations revealed the presence of embryonated eggs in its feces. Cultures on the feces demonstrated the presence of L3 larvae with a notched tail, which is a characteristic of the genus *Strongyloides.*

In order to identify the *Strongyloides* species involved in this parasitism, experimental infection in a domestic cat (*F. catus domesticus*) was conducted subsequently. For this, samples of the *L. tigrinus* feces were cultivated in sterilized equine feces and maintained in an incubator at 25 °C and 80% humidity, for seven days.

The material was analyzed under a microscope in order to detect any third-stage filariform larvae. These larvae were collected using Baerman's method. About 17,000 larvae were thus obtained to experimentally infect a domestic cat (a 30-day-old female). This animal had previously treated with antihelminthic drugs and coproparasitological examinations had been performed to confirm that it was free from helminth infection.

Three thousand infective (L3) larvae were inoculated subcutaneously in this animal. After inoculation, fecal flotation examinations were successively performed until the feces become positive for embryonated eggs. The cat was then sacrificed and parthenogenetic female were recovered. In order to obtain free-living males and females, cultures with feces from domestic cats were made, but no positive results were obtained.

Biometric analyses on both the parthenogenetic females and the eggs were performed using a computerized image analysis system (Qwin Lite 3.1; Leica). The results presented below are expressed as means and ranges (minimum and maximum).

The measurements on the parthenogenetic females were as follows (n = 6; Figure 1): total length 3,561 µm (3,314-3,966); maximum width 48 µm (42-52); esophagus 753 µm (728-784) in length and 21.2% (19.7-22.3) of total body length; vulva 1251 µm (1,194-1,338) from the anterior extremity; tail 33 µm (28-36); eggs (inside the uterus) 71 µm (58-84) in length and 29 µm (24-36) in width. Comparison of this biometric data with the data in the literature did not enable identification of the species.

The present study reports the first case of *Strongyloides* sp. in *L. tigrinus*. Other cases in domestic and wild felids have been

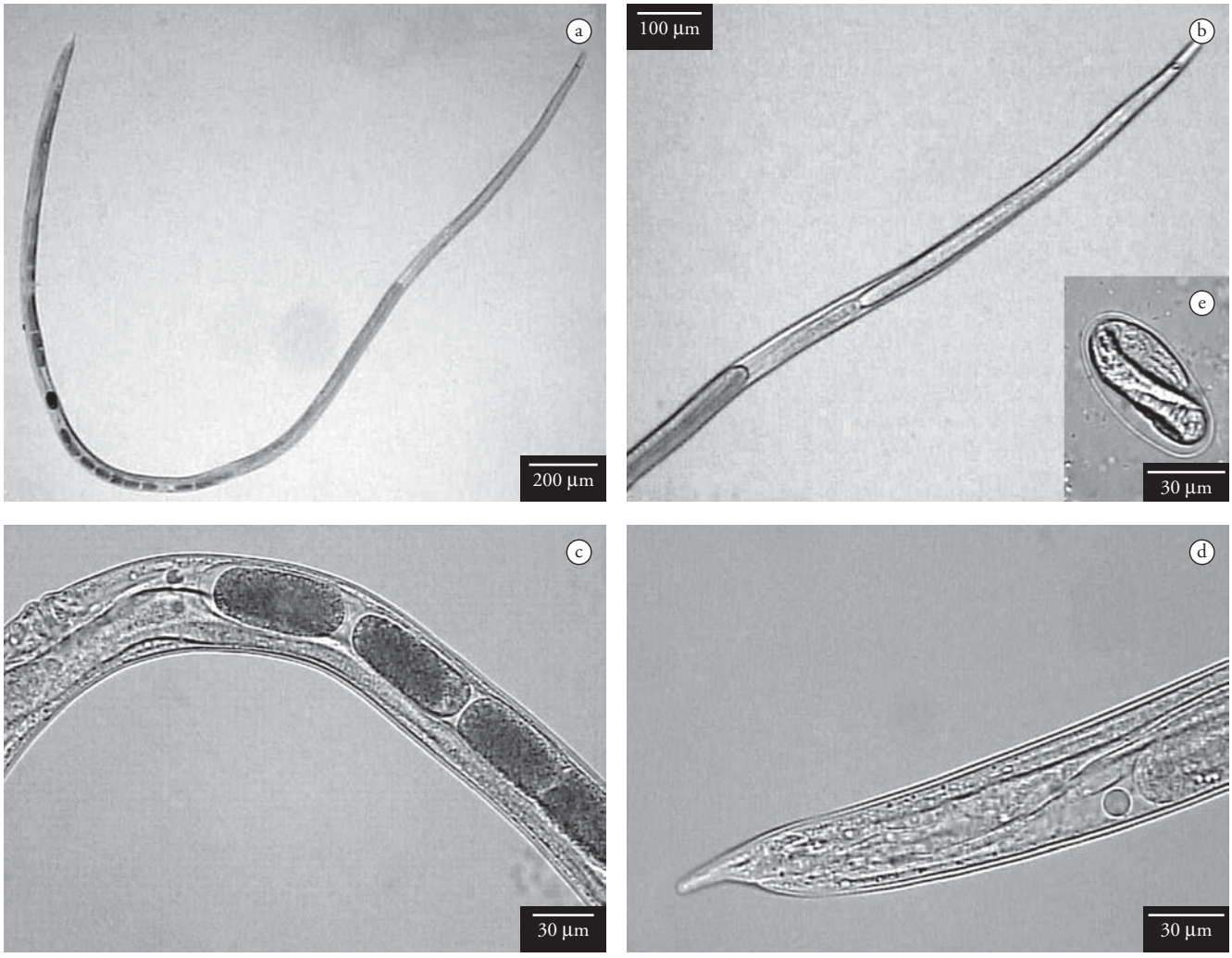

Figure 1. *Strongyloides* sp. collected from the small intestine of *Felis catus domesticus* after experimental infection with *Strongyloides* infective larvae (L3) obtained from culturing of *Leopardus tigrinus* feces: a) general view; b) Detail of the esophagus, initial portion of the intestine and ovary; c) Detail of vulva and uterus with eggs; d) Detail of tail and anus; and e) egg.

reported (VICENTE et al., 1997; BOWMAN et al., 2002), but this is a rare finding. Oliveira and Cassaro (1999) reported that because wild felids have solitary habits and most of them are predominantly nocturnal, field observations are scarce and, thus, few data about their biology are available.

An experimental infection was conducted in order to identify the *Strongyloides* species found in this *L. tigrinus* individual because no parthenogenetic female could be recovered from this host, since the animal was reintroduced to the environment after proper medical treatment. The attempted use of another host in the same family for experimental infection produced positive results, since parthenogenetic females were recovered from the domestic cat used in this experiment. However, from the three thousand infective larvae inoculated, only six parthenogenetic females were recovered. In addition, no free-living males or females were recovered from the feces cultures.

Since a low percentage of the larvae completed the biological cycle, few parthenogenetic adult females were recovered. This may have been either because *F. catus domesticus* is not the specific host for the nematode that was examined, or because the felid immune system was able to react, thereby expelling these larvae (through IgA, which activates the eosinophils) (OLIVEIRA SEQUEIRA, 2000; CLAEREBOUT, 2000; SOULSBY, 1987). In addition, since the host was not specific, the growth and morphology of the parthenogenetic *Strongyloides* females might have undergone changes, thus causing difficulties for parasite species identification (OLIVEIRA SEQUEIRA, 2000; CLAEREBOUT, 2000; SOULSBY, 1987).

Other helminths have been reported infecting *L. tigrinus*. Hungria (1978) reported an occurrence of *Toxascaris leonina* (Hungria, 1978) in *L. tigrinus* in Venezuela. Eggs of *Capillaria* sp., *Ancylostoma* sp., *Trichuris* sp. and *Toxocara* sp. and adults of *Vigosospirura potekhina, Didelphonema longispiculata, Pterygodermatites cahirensis, Trichuris campanula, Ancylostoma tubaeforme* and *Toxocara cati* have also been reported in this felid species by Beldomenico (2005). However, there are no reports on occurrences of a *Strongyloides* spp. infecting *L. tigrinus*. Thus, this felid is a new host recorded for *Strongyloides* sp. These data reinforce the importance of the present report, which contributes towards knowledge of the helminth fauna of wild felids in Brazil.

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