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Short Communication

Dioctophyme renale (Nematoda: Dioctophymatidae) in *Leopardus geoffroyi* (Carnivora: Felidae) in the Neotropical region

Dioctophyme renale (Nematoda: Dioctophymatidae) em *Leopardus geoffroyi* (Carnivora: Felidae) na região Neotropical

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Abstract

Parasitic diseases affecting wild carnivores remain largely unknown or poorly described. Dioctophymosis is a parasitosis caused by the nematode *Dioctophyme renale* that is found worldwide. It affects domestic and wild animals and has been reported frequently in Brazil. This paper reports dioctophymosis in a wild felid for the first time.

Keywords: Dioctophymosis, wild felid, kidney, urban area, Brazil.

Resumo

As doenças parasitárias que acometem os carnívoros silvestres ainda são desconhecidas ou pouco descritas. A dioctofimatose, parasitose de distribuição mundial causada pelo nematoide *Dioctophyme renale*, acomete animais domésticos e silvestres e tem sido relatada com frequência no Brasil. Este estudo reporta o primeiro caso de dioctofimatose em um felídeo silvestre.

Palavras-chave: Dioctofimatose, felídeo silvestre, rim, área urbana, Brasil.

Dioctophyme renale Goeze, 1782, the giant kidney worm as it is popularly known, parasites the urinary tracts of mammals (Canidae and Mustelidae) and acidentally humans (ANDERSON, 2000). The life cycle of *D. renale* is indirect, and its intermediate host is the aquatic annelid *Lumbriculus variegatus* Müller, 1774. This species has been identified both experimentally and naturally as an intermediate host (MACE & ANDERSON, 1975) in North America and was recorded in Patagonia by Miserendino (2007), and in the State of Minas Gerais, Brazil, by Marchese et al. (2015). The definitive hosts are infected by ingesting annelid with third-stage larvae or by ingesting paratenic hosts, such as fish and amphibians (MACE & ANDERSON, 1975; MEASURES & ANDERSON, 1985).

This paper reports the wild felid *Leopardus geoffroyi* d'Orbigny & Gervais 1844, as a new host to *D. renale* in the Neotropical region.

An adult female of *L. geoffroyi* was found dead due to being run over (i.e the specimen was roadkill) in the municipality of Capão do Leão (31º 45' 07.3" S; 52º 25' 19.3" W), in the south of the state of Rio Grande do Sul, Brazil, in July 2017. The carcass was collected (ICMBio/no. 389133) and sent to the Laboratory for Parasitology of Wild Animals, Federal University of Pelotas, for parasitological investigation.

Through the necropsy, a male specimen† of *D. renale* was found in the right kidney of the host (Figure 1). Upon macroscopic examination, the parasitized kidney was fibrous and deformed. We could not find any lesions or *D. renale* in the left kidney or in any other inspected organs. The specimen, of length 19 cm, had morphological characteristics compatible with those reported by Anderson (2000) for *D. renale*: a fleshy bell-shaped copulatory bursa, without any supporting rays, and a single bristle-like spicule.

Although this nematode is commonly found in the right kidney (NAKAGAWA et al., 2007) or free in the abdominal cavity of the definitive hosts, the reasons for its preference for this organ remain unclear. Atypical sites have been described in the stomach and bladder (MIRANDA et al., 1992), testes (REGALIN et al., 2016), mammary glands and inguinal region (PEREIRA-FIGUEIREDO et al., 2013) and spine (BACH et al., 2016).

Occurrence of a single parasite in the host is common, but high-intensity infections have also been reported. In Uruguaiana, a city located in the western region of Rio Grande do Sul - Brazil,

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† The specimen was deposited in the Coleção Helmintológica of the Laboratório de Parasitologia de Animais Silvestres, Instituto de Biologia, Universidade Federal de Pelotas (CHLAPASIL/UFPel), under the number 695.

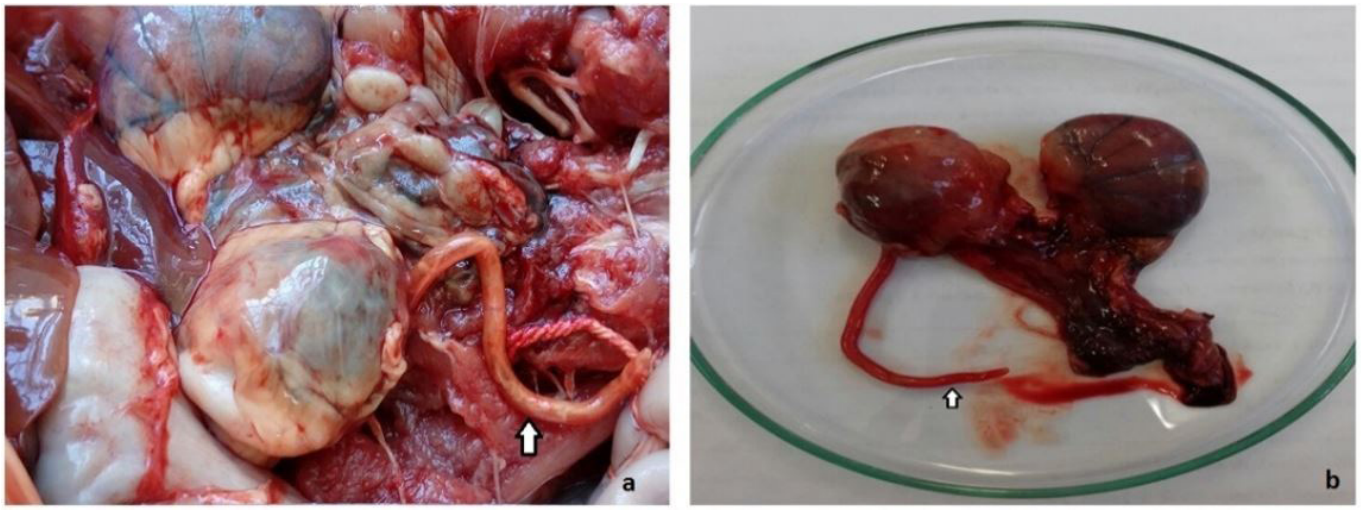

Figure 1. (a, b) Adult male of *Dioctophyme renale* (arrowed), found in right renal capsule.

34 specimens were found in a male dog (MONTEIRO et al., 2002). Perera et al. (2017) found 23 specimens in a female dog in Pelotas (RS, Brazil) and, in the state of Santa Catarina - Brazil, Pedrassani et al. (2014) reported finding two specimens in a female cat: one in the abdominal cavity and another in a supernumerary kidney.

In a study conducted in Pelotas, Rappeti et al. (2017) recorded 92 cases of dioctophymosis in domestic dogs and only three cases in cats, found through necropsy (from 1981 to 2014) and by using ultrasound examination (from 2010 to 2015). The majority of the infected animals are asymptomatic, even if the parasitized kidney has been totally destroyed (MEASURES, 2001). However, in some cases, clinical manifestations such as dysuria, hematuria, and backache are observed (PERERA et al., 2017).

In Brazil, *D. renale* parasitism has been described mainly in canids and mustelids (BARROS et al., 1990; KOMMERS et al., 1999; ZABOTT et al., 2012; VULCANI et al., 2015) but other wild mammals were reported harboring the parasite: *Cebus apella* (tufted capuchin) (ISHIZAKI et al., 2010), *Choloephus didactylus* (southern two-toed sloth) (ROCHA, et al., 1965), and *Nasua nasua* (ring-tailed coati) (MILANELO et al., 2009). Those reports suggest that *D. renale* exhibits low host specificity.

The disease in dogs may be associated not only with consumption of potential paratenic hosts but also with consumption of water from ditches: free-ranging urban dogs are unselective in their feeding habits (BURGOS et al. 2014). Because of cat's strong hunting instincts (and especially so among feral cats), they may well become infected by consuming fish and amphibians (VEROCAI et al., 2009). In Pelotas, third-stage larvae were found encysted in turtles (*Trachemys dorbigni*) and in freshwater fish (*Hoplosternum littorale*). From the 32 specimens of *T. dorbigni* analyzed, 87.5% were infected. These reports alert to the situation of the municipality in relation to parasitosis (MASCARENHAS & MÜLLER, 2015; MASCARENHAS et al., 2016).

The finding of *D. renale* in *L. geoffroyi* corroborates the affirmations of Rappeti et al. (2017), i.e that this region is an ideal environment with the conditions necessary for development and maintenance of the disease. The felid examined here was found in an urban environment in the municipality Capão do Leão, which borders on Pelotas.

The high rates of natural infection among domestic animals and finds in wild animals in the southern region of the State of Rio Grande do Sul serve as a warning of the risks to public health, given that this parasite has zoonotic potential. Although found with low prevalence, occurrences in humans have been recorded in Asia and Europe (KATAFIGIOTIS et al., 2013; NOROUZI et al., 2017). Only one case of human infection in Brazil was documented in 1945 in the State of Maranhão (PAVANELLI et al., 2015).

Despite significant increased published reports of dioctophymosis in Brazil, the epidemiological cycle of this parasite remains unclear. This makes it evident that there is a need for studies concerning the parasite's biology and a need for prompt notifications in cases of diseased domestic and wild animals. This was the first record of *Dioctophyme renale* in a Neotropical felid.

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