

# *Diectophyme renale* (Nematoda: Enoplida) in domestic dogs and cats in the extreme south of Brazil

*Diectophyme renale* (Nematoda: Enoplida) em cães e gatos domésticos no extremo sul do Brasil

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Received September 13, 2016

Accepted October 5, 2016

## Abstract

*Diectophyme renale* is a zoonotic nematode that parasites the kidneys of wild and domestic carnivores, and it has been reported frequently in Brazil. The aim here was to register the number of cases of dogs and cats diagnosed with dioctophymosis by necropsy (1981 to 2014) and ultrasound examination (2010 to 2015) in Pelotas-RS. In this context, a survey was conducted on dioctophymosis cases diagnosed at the Veterinary Pathology Laboratory (LPV) and Veterinary Clinical Hospital (HCV) of the Federal University of Pelotas (UFPel), and at a specialist veterinary imaging diagnostics clinic. In total, 95 cases were registered. The high series of the disease in dogs can be related to the presence of a large number of stray and semi-domestic dogs in the city, and also due to the ingestion of intermediate hosts of *D. renale* parasitized with the infective larvae. Thus, it can be concluded that Pelotas is a city with favorable conditions for the occurrence of dioctophymosis with high rate of disease in recent years.

**Keywords:** Giant kidney worm, dioctophymosis, nematode, parasitosis, urban zone.

## Resumo

*Diectophyme renale* é um nematódeo zoonótico que parasita principalmente o rim de carnívoros silvestres e domésticos, e tem sido relatado com frequência no Brasil. Objetivou-se registrar o número de casos de cães e gatos diagnosticados com dioctofimose por necropsia (1981 a 2014) e exame ultrassonográfico (2010 a 2015) em Pelotas-RS. Nesse contexto, foi realizado um inquérito de casos de dioctofimose em animais de companhia no Laboratório de Patologia Veterinária (LPV) e no Hospital de Clínicas Veterinária (HCV) da Universidade Federal de Pelotas (UFPel), e em uma clínica veterinária especializada em diagnóstico por imagem, totalizando 95 casos registrados. A elevada casuística da doença em cães pode estar relacionada à presença de um grande número de cães errantes e semi-domiciliados na cidade, e também devido à ingestão dos hospedeiros intermediários de *D. renale* parasitados com a larva infectante. Assim, conclui-se que Pelotas é uma cidade propícia para a ocorrência de dioctofimose, com elevada casuística da doença nos últimos anos.

**Palavras-chave:** Verme gigante do rim, dioctofimose, nematoide, parasitose, zona urbana.

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*Diocotophyme renale* (Goeze, 1782), the giant kidney worm, has been reported parasitizing various species of wild carnivores (canids and mustelids) and domestic dogs in several countries. This nematode is often found in the right kidney and rarely in both kidneys. However, there have also been reports of cases in which the helminths were found in the peritoneal cavity of dogs (ANDERSON, 2000). Furthermore, this parasite has great importance due to its zoonotic potential (ALVES et al., 2007).

Canine diocotophymosis has been recorded in several states of Brazil, including Rio Grande do Sul (COLPO et al., 2007; PEDRASSANI et al., 2009; LEMOS et al., 2010; STAINKI et al., 2011). Infection in cats has been reported less frequently, with reports in Rio de Janeiro and Santa Catarina (VEROCAI et al., 2009; PEDRASSANI et al., 2014).

The aim of the present study was to register the number of cases of diocotophymosis in dogs and cats diagnosed in the municipality of Pelotas, Rio Grande do Sul, Brazil.

The investigation of cases of animals with diocotophymosis was obtained from diagnoses made by necropsy and ultrasound examination in Pelotas. With regard to necropsies, data were acquired by the Veterinary Pathology Laboratory (LPV) of the Federal University of Pelotas (UFPEL) between 1981 and 2014. In relation to ultrasound examinations, the data were collected at two sites: the Veterinary Clinical Hospital (HCV) of UFPEL between 2012 and 2015, and the specialist private veterinary imaging diagnostics clinic between 2010 and 2015.

A total of 95 cases of diocotophymosis were diagnosed in the municipality of Pelotas in the three areas surveyed: at LPV-UFPEL, 14 necropsies on dogs parasitized by *D. renale* between 1981 and 2014; at HCV-UFPEL, 28 dogs and one cat between 2012 and 2015; and at the imaging diagnostics clinic, parasitosis was recorded in 50 dogs and two cats between 2010 and 2015. From these observations, it is clear that the greatest number of cases of the disease was identified in the last five years, from 2010, by diagnostic imaging centers, totaling 81 cases.

Ultrasound examinations recorded at the HCV-UFPEL and the image of private clinic revealed a large number of cases of diocotophymosis, given that the private clinic is a referral clinic for Pelotas, because it meets a demand of more than 90% of private clinics in the city. Furthermore, the HCV-UFPEL also includes another important percentage of patients, providing a significant range of diagnoses in the municipality. According to Silveira et al. (2015), the assessments made by ultrasound examination are essential for the definitive diagnosis of the disease because they identify the parasites in different locations in the patient.

As for data necropsy of the LPV-UFPEL, according to the analysis period of 33 years, the number of positive diagnoses was proportionally lower than in relation to the diagnosis made by ultrasound examination cited in this study. It is believed that this difference may have occurred in the results by the facts of the LPV-UFPEL be far from the city center and also the definitive hosts are generally stray animals. Kommers et al. (1999) observed that diocotophymosis occurs more often in stray dogs after evaluating 3,259 necropsies with 0.49% positive for the disease, and of these 75% were street dogs.

In this study, three cats were diagnosed with diocotophymosis, which corroborates with the literature that cites the low frequency

of parasitism in this species, with only two reports in cats (VEROCAI et al., 2009; PEDRASSANI et al., 2014). In contrast, several cases of canine diocotophymosis have been reported in Brazil (COLPO et al., 2007; MESQUITA et al., 2014; RAHAL et al., 2014), but few studies have discussed the factors that might be involved in maintaining the parasitosis. Likewise, there is a large gap in the knowledge of the life cycle of *D. renale* in South America.

The life cycle of nematodes begins with elimination of eggs together with the urine of dogs (the definitive hosts) into an aquatic environment, where the first-stage larvae develop inside the eggs. The eggs are ingested by aquatic oligochaetes (intermediate hosts). The third-stage larvae (which are the infective form of the parasite) develop in the oligochaetes. Fish and frogs (paratenic hosts) become infected through ingestion of aquatic oligochaetes containing the third-stage larvae. In turn, the definitive hosts become infected through ingestion of oligochaetes, fish or amphibians that are parasitized with the third-stage larvae (MACE & ANDERSON, 1975). In the municipality of Pelotas, turtles and freshwater fish have been recorded as presenting third-stage larvae of *D. renale*. In the turtle species *Trachemys dorbigni* (Testudines: Emydidae), the prevalence was 87.5% (n = 32 examined) and the mean intensity of infestation was 13.9 larvae/host (MASCARENHAS & MÜLLER, 2015).

In relation to fish, Mascarenhas et al. (2016) reported that four specimens of *Hoplosternum littorale* (Siluriformes: Callichthyidae) that were examined were parasitized with third-stage larvae of *D. renale*, with findings of one to five larvae. Mascarenhas & Müller (2015) commented that the high prevalence of larvae in turtles in the municipality of Pelotas might be related to the presence of parasitized domestic dogs, which spread eggs through their urine, thus contaminating urban water bodies that turtles and oligochaetes cohabit. The number of cases of diocotophymosis in dogs recorded in the present study corroborates the hypothesis of Mascarenhas & Müller (2015). It is believed that there is a high rate of occurrence of this parasitosis in this municipality given that the dog population in Pelotas is approximately 66,723 (46,706 semi-domestic, 6,672 street and 13,345 domestic dogs) (PELOTAS, 2012).

In relation to the source of infection for the dogs, it is believed that they become infected through drinking water containing oligochaetes that are parasitized with infective third-stage larvae, given that these invertebrates are obligate intermediate hosts in the nematode cycle (ANDERSON, 2000). The eutrophication process caused by the demands of organic material and other domestic residues in these urban aquatic environments may have favored an increase in the oligochaete population, thus contributing towards maintaining the cycle in the urban area.

The low rates of parasitism due to larvae of *D. renale* recorded in fish and amphibians (paratenic hosts) (MEASURES & ANDERSON, 1985; PEDRASSANI et al., 2009; ABDALLAH et al., 2012; MASCARENHAS et al., 2016) suggest that these hosts do not represent the main source of infection for domestic dogs. Additional studies need to be conducted in this region in order to seek further information that might aid in understanding the urban dynamics of the cycle of *D. renale*. This information could be used in control and prophylaxis programs against this parasitosis.

From the present study, it can be concluded that the municipality of Pelotas has an environment and conditions that favor development and maintenance of dioctophymosis, with 95 cases of parasitic disease identified in dogs and cats, being 81 in diagnostic imaging centers in the city between 2010 and 2015, and 14 cases in LRD between 1981 and 2015.

## Acknowledgements

We are grateful to Dr<sup>a</sup> Stella Falkenberg Rausch, the owner of the veterinary imaging diagnostics clinic (Clínica Veterinária Diagnóstico por Imagem Stella Falkenberg Rausch).

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