




Clinical Reports

## ***Spirometra mansonoides* from a domestic cat in northeastern Brazil: case report**

*Spirometra mansonoides* de um gato doméstico no nordeste do Brasil: relato de caso

Vitória Figueiredo Lima<sup>1</sup> , Higina Moreira Melo<sup>1</sup> , Sheyla Xavier de Sousa<sup>1</sup> , Thiago da Silva Brandão<sup>1</sup> , Antônio Fernando de Melo Vaz<sup>1\*</sup> 

<sup>1</sup> Veterinary Clinical Pathology Laboratory, Veterinary University Hospital, Federal University of Campina Grande, Patos, Brazil.

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### ABSTRACT

Class Cestoda, in addition to causing problems for the health of animals, has been very relevant for human public health due to the zoonotic character of some species. In reporting a case of a domestic cat diagnosed with *Spirometra mansonoides* in northeastern Brazil, we demonstrate the importance of the association among different diagnostic techniques in the identification of the parasite, as well as report the presence of this parasite in domestic cats in the Northeast region. An old female feline with limited mobility was rescued and clinically evaluated. The observed bowel loop thickening and cachexia were suggestive of parasitosis, but the diagnosis and therapy were initially concentrated only on the fracture of a limb. Two months after the first diagnosis, the animal spontaneously expelled a parasite in its stool. Eggs and an adult parasite were found and identified by the association of diagnostic techniques such as coproparasitological and morphological studies. The case was the first to identify the species in the region and to signal the epidemiological surveillance of the zoonotic potential of the specimen.

### RESUMO

A classe Cestoda, além de causar problemas para a saúde dos animais, tem se mostrado muito relevante para a saúde pública humana devido ao caráter zoonótico de algumas espécies. Ao relatar o caso de um gato doméstico com diagnóstico de *Spirometra mansonoides* no Nordeste do Brasil, demonstramos a importância da associação entre diferentes técnicas diagnósticas na identificação do parasita, como também relatamos a presença deste parasita em gatos domésticos da região Nordeste. Uma felina idosa com mobilidade limitada foi resgatada e avaliada clinicamente. O espessamento da alça intestinal e a caquexia observada foram sugestivos de parasitose, mas o diagnóstico e a terapia foram inicialmente concentrados apenas na fratura de um membro. Dois meses após o primeiro diagnóstico, o animal expeliu espontaneamente um parasita em suas fezes. Ovos e um parasita adulto foram encontrados e identificados pela associação de técnicas diagnósticas como estudos coproparasitológicos e morfológicos. O caso foi o primeiro a identificar a espécie na região e a sinalizar a vigilância epidemiológica do potencial zoonótico do espécime.

*Palavras-chave:*

Exames parasitológicos

Felino

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Região semiárida brasileira

### INTRODUCTION

*Spirometra mansonoides* is a parasite of the small intestine of felines, canids and wild mammals that has been reported from the eastern United States to South America (MULLER; MIRANDA; FERNÁNDEZ, 1975). Epidemiological data have shown that the consumption of exotic meat by humans and animals is the main form

of contagion in more than 30 countries (LIU et al., 2015; CDC, 2017). In wild animals, the genus was detected by molecular biology with a relatively high frequency (ODA, et al., 2016). In Brazil, contemporary lifestyles that include living with domestic animals may still be the main access route. Cats, as a species that is often afforded freedom and has a habit of hunting small amphibians and reptiles, are the most likely to be the reservoir and

\* Corresponding author: [antonio.melo@ufcg.edu.br](mailto:antonio.melo@ufcg.edu.br)

disperser of this pathogen (GRISOLIO et al., 2017). The prevalence of this parasite has been considered underestimated in Brazil. However, *Spirometra* spp. have been reported in the states of Tocantins, Mato Grosso, Rio Grande do Sul and Minas Gerais (MARQUES et al., 2019).

Cats are generally asymptomatic, but may demonstrate progressive weight loss, severe anemia and bowel wall thickening (MARQUES et al., 2019). This parasite has public health relevance by triggering sparganosis, a human parasitosis caused by ingestion or active penetration of plerocercoid larvae. A variety of clinical manifestations can occur through the migration of larvae in subcutaneous tissues and in severe cases triggers neurological symptoms such as convulsion and headache in humans (LIU et al., 2015; CDC, 2017).

The purpose of the case report was to highlight the importance of the association among different diagnostic techniques in the identification of the parasite, as well as to report the occurrence of *Spirometra* spp. in domestic cats in northeastern Brazil.

### CASE REPORT

In May 2017 a female, aged cat, weighing 2.7 kilograms, was assisted at the University Veterinary Hospital (UVH) of the Federal University of Campina Grande (UFCG), state of Paraíba in northeastern Brazil. The animal was a stray but received care from the person who brought it to UVH. The feline had difficulty in moving and a fracture in the left pelvic limb was suspected. There was no information on feeding and water intake, as well as no history of vaccinations, vermifuges, or previous diseases or treatments. A complete physical examination was performed and the following complementary examinations were requested: abdominal ultrasonography, left pelvic limb radiography and complete blood count.

The initial physical examination found the animal active, with a body score of 2.5, on a scale from one to five and a degree of dehydration of 8%. The lymph nodes were considered unchanged and the ocular and oral mucosa were normal. On abdominal palpation the intestinal loops were found to be thickened. The diagnosis was initially concentrated on the fracture of the limb, but when assessing the body score of the animal, the degree

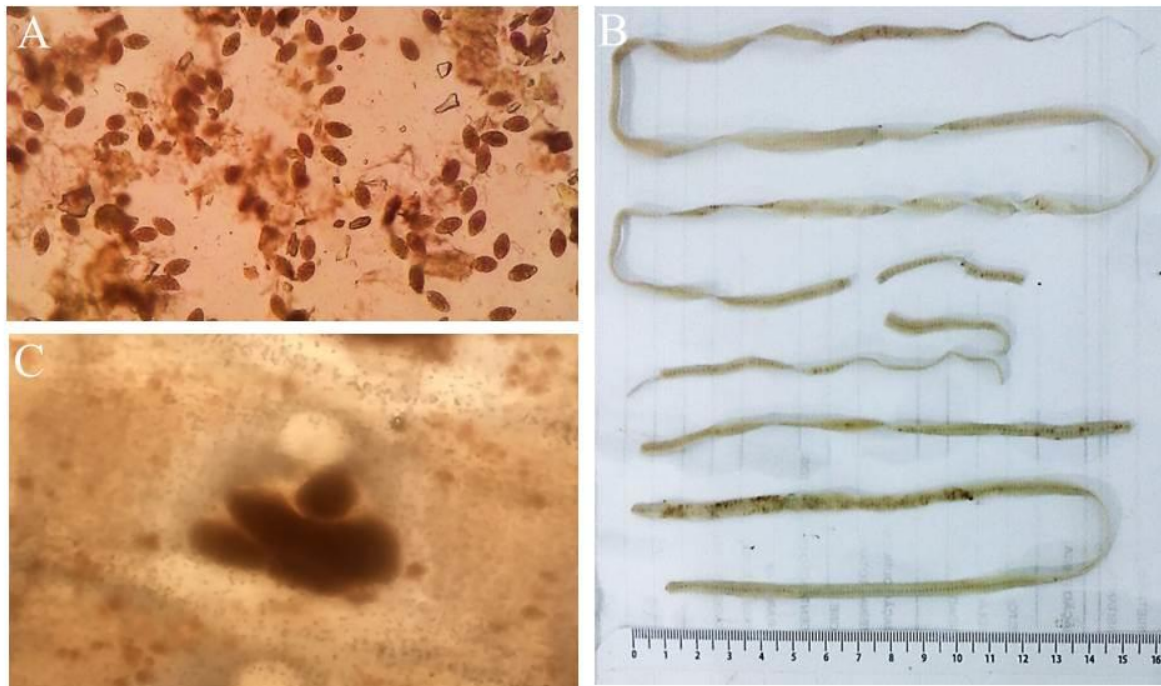
of dehydration, hyperproteinemia through total plasma protein, and ultrasound findings with loss of renal architecture were suggestive of renal injury. The observed bowel loop thickening and cachexia were suggestive of parasitosis. Despite the suspicion of parasitosis, the diagnosis and therapy were initially concentrated only on the fracture of a limb. Parasitological stool examination and antiparasitic therapy was not performed.

In July 2017, the caregiver reported that the animal naturally expelled a parasite in its stool and was instructed to collect the material immediately for analysis. The material was sent to the Laboratory of Veterinary Clinical Pathology (LVCP/UVH) and three methods were performed to identify the parasite eggs (Figure 1A): the direct method, the simple sedimentation method and the Willis-Mollay method, through which Cestoda eggs were observed.

In addition to stool analysis, a single adult parasite was identified in the Parasitology Laboratory of the same institution. Proglottids were visualized under a stereomicroscope after washing and clearing according to YAMAGUTI (1959). Following the spontaneous emission of the parasite, the following observations were made: the rupture of the parasite into six fragments, suggesting an estimated total length of the nematode of 1 meter (Figure 1B), the uterus in a spiral tube with four turns (Figure 1C) and the length of mature segments being shorter than the width when compared to the younger segments. Thus, according to the description of BOWMAN (2010), identification of the species *S. mansonioides* was indicated.

After association of diagnostic techniques such as coproparasitological and morphological study, the patient was treated with a therapeutic dose 0.5 mL/kg of vermifuge (Vetmax Plus® oral suspension) composed of Pyrantel Pamoate (144 mg), Praziquantel (50 mg) and Fenbendazole (200 mg) with repetition of the protocol after 15 days. Antiparasitic therapy was completed, however, due to complications of kidney injury, the animal was euthanized. Necroscopic and histopathological evaluations did not indicate continued infection, therefore it was assumed that the therapeutic treatment for endoparasitosis was effective.

Figure 1. *Spirometra mansonoides* from a domestic cat. A) Eggs of the *S. mansonoides* parasite in the form of opercules seen in the simple sedimentation method at 400× magnification under an optical microscope. B) *S. mansonoides* shown with a ruler, making it possible to verify the length of the parasite as more than one meter. C) Uterus of the *S. mansonoides* parasite, characterized by having the organ centered and spiral-shaped containing four turns; it is possible to observe the released eggs of the parasite at 40× magnification under a stereomicroscope.



## DISCUSSION

The endoparasitosis in question was diagnosed only after the parasite was expelled, as no parasitological examination was requested in any of the consultations. Although the parasitological techniques used were not specific for Cestoda eggs, it was possible to identify the family due to the high parasitemia of the animal. The direct method is not very sensitive but is used as an initial screening technique for the parasite. The sedimentation method is efficient when associated with the Willis-Mollay method for endoparasites in felines (RIBEIRO et al., 2015). The Willis-Mollay technique is normally used for nematode identification (PELCHEBISKI et al., 2010).

The identification of the parasite is based on geographical distribution, ecosystem and morphology (LIU et al., 2015). Although *Diphyllobothrium latum* and *S. mansonoides* belong to the same family, the differentiation starts with the geographical distribution, since the former has greater prevalence in countries of the Northern Hemisphere, while the latter has worldwide distribution (CDC, 2017). In Brazil, *S. mansonoides* in cats has been reported in the North, Central-west and South regions of the country (MARQUES et al., 2019). In wild animals, the genus has been detected by molecular biology with high frequency (ALMEIDA, et al., 2016; ODA, et al., 2016). The spiral-shaped uterus and oval, brownish-yellow eggs with a distinct operculum at one of the poles are important characteristics of the species (BOWMAN, 2010), but the best way to identify *Spirometra* spp. would be to infect a

suitable definitive host with the parasite (CDC, 2017). As the definitive host of *S. mansonoides* was a cat, it was possible to identify it. Careful attention in identifying the parasite and the procedures to be taken for care of an animal with verminosis is important both for the welfare of the animal and for the caregiver, since the parasitosis in question has a zoonotic character.

Sparganosis is a zoonosis caused by infection with *Spirometra* spp., has worldwide relevance and is endemic to North America. Humans contaminate themselves through ingestion of contaminated water and consumption of undercooked exotic meat, mainly from wild animals (LIU et al., 2015). This parasitosis can live up to 20 years in the human host and can be located in different tissues and organs, including subcutaneous tissue, breast, orbit, urinary tract, pleural cavity, lungs, abdominal viscera and the central nervous system (ANANTAPHRUTI; NAWA; VANVANITCHAI, 2011). Sparganosis is a rare disease, but with numerous reported cases. It is not uncommon to find tapeworm in definitive hosts in places where the disease has been cited and occasionally occurs in Australia, the European Union, South Africa, Brazil, Ecuador, Paraguay, Colombia, Venezuela and Argentina (MUÑOZ, 2015).

## CONCLUSIONS

The occurrence of *Spirometra* spp. in domestic cats in northeastern Brazil reinforces the importance of checking the health of domestic animals through the association among different diagnostic techniques for correct parasite identification.

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## REFERENCES

- ALMEIDA, G.G. et al. Molecular identification of *Spirometra* spp. (Cestoda: Diphylobothriidae) in some wild animals from Brazil. *Parasitology International*, v. 65, p. 428-431, 2016.
- ANANTAPHRUTI, M.T., NAWA, Y., VANVANITCHAI, Y. Human sparganosis in Thailand: an overview. *Acta Tropica*, v. 118, n.3, p. 171-176, 2011.
- BOWMAN, D.D. *Georgis: Parasitologia Veterinária*. 9<sup>a</sup> Ed. Elsevier, Amsterdam, 2010, p. 329.
- CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC), 2017. Sparganosis, Accessed 07 February 2020. <https://www.cdc.gov/dpdx/sparganosis/index.html>.
- GRISOLIO, A.P.R. et al. O Comportamento de Cães e Gatos: Sua importância para a saúde pública. *Revista de Ciência Veterinária e Saúde Pública*, v. 4, n.1, p. 117-126, 2017.
- LIU, Q. et al. Human sparganosis, a neglected food borne zoonosis. *The Lancet Infectious Diseases*, v. 10, p. 1226-1235, 2015.
- MARQUES, S.M.T. et al. *Spirometra mansonoides* (Cestoda: Diphylobothriidae) in feces of felids attended in Porto Alegre /RS: a neglected parasite. *Pubvet*, v. 13, n. 4, p. 1-4, 2019.
- MUELLER, J.F., FRÓES, O.M., FERNÁNDEZ, T. On the occurrence of *Spirometra mansonoides* in South America. *Journal of Parasitology*, v. 61, n.4, p. 774-775, 1975.
- MUÑOZ, P. Esparganosis. *Revista Chilena de Infectología*, v. 32, n.4, p. 457-457, 2015.
- ODA, F.H. et al. Parasitism by larval tapeworms genus *Spirometra* in South American amphibians and reptiles: new records from Brazil and Uruguay, and a review of current knowledge in the region. *Acta Tropica*, v. 164, p. 150-164, 2016.
- PELCHEBISKI, S. et al. Parasitological diagnosis of gastrointestinal helminths of dogs and techniques evaluation. *Ciência Animal Brasileira*, v. 20, p. 51-55, 2010.
- RIBEIRO, E.S. et al. Diagnosis of gastrointestinal parasites in cats: a comparison of different methodologies. *Acta Veterinaria Brasilica*, v. 9, n.4, p. 381-385, 2016.
- YAMAGUTI, S. *The cestodes of vertebrates*. v. 2. Interscience Publishers, New York, 1959, 860 p.