
**ABSENCE OF ANGIOSTRONGYLID NEMATODES
IN WILD NON-FLYING SMALL MAMMALS
IN *DUAS BOCAS* BIOLOGICAL RESERVE,
CARIACICA, SOUTHEASTERN BRAZIL**

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ABSTRACT

A search for angiostrongylid worms was performed in histological sections of viscera from 129 specimens of wild non-flying small mammals captured in the Duas Bocas Biological Reserve, municipality of Cariacica, Espírito Santo, southeastern Brazil. No intra-arterial worm was detected but probable filarid worms were found inside the bronchial tree of two animals, one specimen each of *Metachirus nudicaudatus* and *Didelphis aurita*. Cases of human infection both with *Angiostrongylus costaricensis* and *Angiostrongylus cantonensis* have already been reported from Cariacica in Espírito Santo, but there is no data on natural infection of non-human mammals. This report deals with a first attempt to identify angiostrongylid worms in animals from a Biological Reserve in the State of Espírito Santo.

KEY WORDS: *Angiostrongylus*. Rodentia. Didelphimorphia, Duas Bocas Biological Reserve.

Among the angiostrongylid nematodes, two species causing human infection, *Angiostrongylus costaricensis* Morera & Céspedes, 1971 and *Angiostrongylus cantonensis* (Chen, 1935) have already been detected in the southeastern Brazilian State, Espírito Santo (Pena et al., 1995; Caldeira et al., 2007). Both parasites have rodents as definitive hosts. The former is a New World species and causes eosinophilic gastroenteritis while the latter occurs mainly in Asia and the Pacific Islands and is the causative agent of cerebral angiostrongyliasis (Wang et al 2008). *Rattus norvegicus* (Berkenhout, 1769) harbouring *A. cantonensis* and travelling with ships possibly brought the parasite to several countries in North,

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Received for publication: 5/6/2010. Revised form in: 29/6/2010. Accepted: 1/7/2010.

South, and Central America. In Brazil, the Asiatic rat worm has already been detected in their mollusk intermediate hosts in Espírito Santo, Pernambuco, São Paulo and Rio de Janeiro (Caldeira et al., 2007; Thiengo et al. 2010) and the human infection was recorded in Espírito Santo and Pernambuco (Lima et al., 2009). Abdominal angiostrongyliasis is endemic in southern Brazil and has already been identified as a causative agent of human disease in Espírito Santo (Graeff-Teixeira et al 1991; Pena et al., 1995). While several rodents have been found infected in Colombia and Costa Rica, only two cricetid species, *Oligorizomys nigripes* (Olfers, 1818) and *Oryzomys ratticeps* (Hensel, 1873) were identified as natural definitive hosts in southern Brazil (Graeff-Teixeira et al., 1990).

Rodents and marsupials were collected monthly between May and September 2007 at Duas Bocas Biological Reserve (20° 18' 05" S, 40° 28' 06" W; 550 m elevation), during five consecutive nights, by using pitfalls and traditional live traps. Six 100 m transects were established, where eleven pitfall traps (60-liter buckets, 40 cm in diameter by 54 cm in depth) were installed 10 meters apart. The buckets were connected by 50 cm-high drift fences secured by wooden stakes. In addition, conventional live traps for small mammals were used as follows: one Sherman (23 cm x 9 cm x 9 cm) and one wire cage (32 cm x 15 cm x 15 cm) were arranged within a radius of about five meters of each pitfall. These traps were baited with pineapple and peanut butter. In the odds collection points of transect, Sherman trap was fixed at least one meter above the ground level and wire cages at the ground level while in the even collection points of transect, distribution of traps was inverted. Mammal taxonomy follows Wilson and Reeder (2005). Mammal vouchers were deposited in the mammal collection at Universidade Federal do Espírito Santo (UFES), Vitória, Brazil. Fragments of lungs, mesenteric tissues, and heart were removed at necropsy and fixed with 10% formalin. Sections 10 µm thick were stained by Eosin-Hematoxin.

The trapping effort was 1,650 pitfall trap-nights and 3,300 live trap-nights, resulting in 129 captures of mammals (2.6% success) belonging to 15 species as shown in Table 1. No evidence of intra-arterial nematode worms was obtained from histological examination of 129 samples. Unidentified parasites were detected in 16 samples from 7 species (Table 1): *Didelphis aurita* (Wied-Neuwied, 1826), *Gracilinanus microtarsus* (Wagner, 1842), *Marmosops incanus* (Lund, 1840), *Metachirus nudicaudatus* (Desmarest, 1817), *Philander frenatus* (Olfers, 1818), *Rhipidomys mastacalis* (Lund, 1840), *Trinomys paratus* (Moojen, 1948). Identification of parasites other than angiostrongylid worms was not possible due to insufficient morphological features in the available sections, except for intra-bronchial adult worms with hatched larvae inside the uterus, most probably filarid worms, in one specimen each of *M. nudicaudatus* and *D. aurita*. Considering the focal occurrence of angiostrongylid worms they are more easily found in natural hosts when searching is orientated by recently diagnosed human disease (Caldeira et al 2007; Thiengo et al. 2010), which was not the case in the present investigation.

A. cantonensis was probably only recently introduced in areas of Espírito Santo through the black rat, *R. norvegicus*, hiding in ships and infection of native wild rodents is not expected at the present initial stage of invasion. The widespread occurrence of exotic giant African snail, *Achatina fulica* Bowdich, 1822, adds permanent concern for the spreading of angiostrongyliasis in Brazil, especially regarding *A. cantonensis* (Thiengo et al. 2007). There is no report on the occurrence of *A. fulica* at the Biological Reserve under study and the data now presented is not representative at large for the municipality of Cariacica.

Table 1. Species found infected with unidentified parasites other than angiostrongylid worms in wild non-flying mammals captured in Reserva Biológica de Duas Bocas, Cariacica, Espírito Santo, Brazil, from May to September 2007.

Species	Total	Non-infected	Infected
Didelphimorphia, Didelphidae:			
<i>Didelphis aurita</i> (Wied-Neuwied, 1826)	1	0	1
<i>Gracilinanus microtarsus</i> (Wagner, 1842)	9	7	2
<i>Marmosops incanus</i> (Lund, 1840)	3	1	2
<i>Metachirus nudicaudatus</i> (Desmarest, 1817)	16	11	5
<i>Micoureus paraguayanus</i> (Tate, 1931)	5	5	0
<i>Monodelphis iheringi</i> (Thomas, 1888)	2	2	0
<i>Monodelphis americana</i> (Müller, 1776)	18	18	0
<i>Philander frenatus</i> (Olfers, 1818)	1	0	1
Rodentia, Cricetidae:			
<i>Akodon cursor</i> (Winge, 1887)	5	5	0
<i>Juliomys pictipes</i> Osgood, 1933	1	1	0
<i>Nectomys squamipes</i> (Brants, 1827)	6	6	0
<i>Oligoryzomys nigripes</i> (Olfers, 1818)	10	10	0
<i>Rhipidomys mastacalis</i> (Lund, 1840)	15	12	3
<i>Thaptomys nigrita</i> (Lichtenstein, 1829)	1	1	0
Rodentia, Echimyidae:			
<i>Trinomys paratus</i> (Moojen, 1948)	36	34	2
Total	129	113	16

In conclusion, angiostrongylid worms were not detected in small mammals captured in an area next to locations where both *A. costaricensis* and *A. cantonensis* have already been identified as causative agents of human angiostrongyliasis.

RESUMO

Ausência de nematódeos angiostrongilídeos em pequenos mamíferos silvestres não alados, na reserva biológica de Duas Bocas, Cariacica, Sudeste do Brasil

Uma busca por angiostrongilídeos foi realizada em cortes histológicos de vísceras provenientes de 129 pequenos mamíferos não voadores capturados na Reserva

Biológica de Duas Bocas, município de Cariacica, Espírito Santo, Brazil. Não foram encontrados vermes intra-arteriais. Dentro da árvore brônquica de dois indivíduos, identificados como *Metachirus nudicaudatus* e *Didelphis aurita* foram encontrados vermes cilíndricos, provavelmente filarídeos. Infecção humana, tanto por *Angiostrongylus costaricensis* quanto por *Angiostrongylus cantonensis*, já foi registrada no Espírito Santo, inclusive nesta região de Cariacica, porém não há dados sobre a infecção natural em outros mamíferos. Este relato trata de uma tentativa pioneira de identificar angiostrongilídeos em animais coletados em uma Reserva Biológica no Estado do Espírito Santo.

DESCRITORES: *Angiostrongylus*. Rodentia. Didelphimorphia, Reserva Biológica Duas Bocas.

Acknowledgments

Fieldwork was funded by Fundação de Apoio a Ciência e Tecnologia do Espírito Santo (FAPES) and Fundo de Apoio a Ciência e Tecnologia do Município de Vitória (FACITEC). TM Pereira and C Graeff-Teixeira are recipients of CNPq (Conselho de Desenvolvimento Científico e Tecnológico do Brasil) fellowships PUCRS-PIBIC and PQ 1D and Grant 477260/2006. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) provided collecting permits (02009.001798/2006). Instituto de Defesa Agropecuária e Florestal (IDAF) provided lodging and logistic support in the field.

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