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

Thais Martins Pereira, 1 Israel de Souza Pinto, 2 Leonora Pires Costa 3 and Carlos Graeff-Teixeira 1

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 angiostrongilid 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 norvergicus (Berkenhout, 1769) harbouring A. cantonensis and travelling with ships possibly brought the parasite to several countries in North,
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
bailed 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-Hematoxilin.

The trapping effort was 1,650 pitfall trap-nigths 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. norvergicus*, 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.

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

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


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REFERENCES