

ORIGINAL ARTICLE / ARTÍCULO ORIGINAL

THE HELMINTH PARASITES OF *RATTUS RATTUS* (LINNAEUS, 1758) OF URBAN, INTERMEDIATE AND RURAL ENVIRONMENTS IN SOUTHERN BRAZIL

LOS HELMINTOS PARÁSITOS DE *RATTUS RATTUS* (LINNAEUS, 1758) DE LOS ENTORNOS URBANOS, INTERMEDIOS Y RURALES EN EL SUR DE BRASIL

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Suggested citation: Araujo, EO, Mendes, MM, Langone, PQ & Müller, G. 2014. The helminth parasites of *Rattus rattus* (Linnaeus, 1758) of urban, intermediate and rural environments in southern Brazil. *Neotropical Helminthology*, vol. 8, n°1, jan-jun, pp. 19 - 22.

Abstract

Rattus rattus has synanthropic habits which make it an important rodent for the dissemination of zoonotic parasites. Thirty individuals were captured and necropsied with the aim of knowing their helminth fauna. Three species of parasites were found, two nematodes (*Aspiculuris tetraptera* and *Syphacia obvelata*) and one cestode (*Hymenolepis diminuta*). The rural area showed most diversity of helminths.

Keywords: *Aspiculuris tetraptera* - *Syphacia obvelata* - *Hymenolepis diminuta* - house rodents.

Resumen

Rattus rattus tiene hábitos sinantrópicos que lo convierten en el roedor importante para la difusión de parásitos zoonóticos. Treinta individuos fueron capturados y sometidos a necropsia con el objetivo de conocer la fauna de helmintos de *R. rattus*. Se encontraron tres especies, dos nematodos (*Aspiculuris tetraptera* y *Syphacia obvelata*) y uno cestodo (*Hymenolepis diminuta*). El área rural mostró mayor diversidad de helmintos.

Palabras clave: *Aspiculuris tetraptera* - *Syphacia obvelata* - *Hymenolepis diminuta* - roedores domésticos.

INTRODUCTION

Rattus rattus (Linnaeus, 1758) (Rodentia) is an omnivorous species. It has terrestrial habit, great skill for climbing, lives in dry places, housing, barns, and between floors. It is usually found near human housing, and has been recorded in all states of Brazil (Bonvicino *et al.*, 2008).

Several studies were performed on helminth parasites of *R. rattus*, throughout its geographic distribution, showing that the species may be

infected by a number of parasites. Moreover it may act as a zoonotic vector representing a serious risk to human health (Webster & Macdonald, 1995). The helminths *Angiostrongylus* spp. (Loría-Cortés & Lobo-Sanahuja, 1980), *Capillaria hepatica* (Bancroft, 1893) (Sawamura *et al.*, 1999), *Capillaria* sp. (Ewing & Tilden, 1956), *Syphacia* spp. (Stone *et al.*, 1966) and *Trichuris* spp. (Gonçalves *et al.*, 2003) (Nematoda); *Hymenolepis diminuta* (Rudolphi, 1819) (Marangi *et al.*, 2003), *Hymenolepis nana* (Siebold, 1852) (Mirdha & Samantray, 2002) *Hymenolepis* spp. (Rokni,

2008) and *Moniliformis moniliformis* (Bremser, 1811) (Ikeh *et al.*, 1992) (Cestoda) are mentioned in literature.

Urban expansion into rural environments possible the proximity of these animals to humans, so this work aims to meet the helminths harbored by this host in urban, intermediate and rural environments in southern Brazil.

MATERIAL AND METHODS

The study was performed in southern Rio Grande do Sul State, Brazil. Thirty *R. rattus* were captured, 20 from urban environment in the municipality of Pelotas (S: 31° 46' 34" and W: 52° 21' 34"), three from intermediate environment, and seven from rural environment in the municipality of Capão do Leão (S: 31° 46' 3" and W: 52° 26' 55"). The capture was made with Tomahawk cage traps, using a mixture of peanut butter, banana, sardine, and wheat flour as bait. After capturing, the animals were sedated and euthanized according to CFMV (2002) and then necropsied. The nematodes were clarified in lactophenol, and cestodes were stained with hematoxylin for identification, helminths were deposited in the collection of Laboratório de Parasitologia de Animais Silvestres da Universidade Federal de Pelotas. Parameters of prevalence (P), abundance (A), and mean intensity (MI) of parasitism were evaluated according to Bush *et al.* (1997).

RESULTS

Three species of helminth were found, two belonging to Phylum Nematoda and one to Class Cestoda. The overall prevalence of parasitism was 33.3% (n=10). The highest prevalence was observed in the intermediate area (100%), followed by rural area (42.85%) and urban area (20%).

Syphacia obvelata (Rudolphi, 1802) was the most prevalent parasite (23.32%), with highest MI (= 30) and A (= 7), followed by *H. diminuta* with P = 10%, MI = 2 and A = 0.2. *Aspicularis*

tetraptera (Nitzsch, 1821) was represented by only one specimen with P= 3.33% and A=0.03.

The rats from rural area had two species of parasites (*A. tetraptera* and *H. diminuta*), which were unique to that place. Intermediate and urban areas shared *S. obvelata*, the only one for those places.

DISCUSSION

The number of species found and the prevalence of parasitism were lower than reported in literature for other regions of the world (Seng *et al.*, 1979; Hasegawa & Masako, 1999; Ajayi *et al.*, 2007). This may be due to the low sample size of *R. rattus* captured in this study.

Only one study was performed using the same sample size, also with low diversity of helminths, recording the cestode *H. diminuta* and three nematodes *Protospirura chanchanensis* (Ibañez, 1966), *S. obvelata*, and *Heterakis spumosa* (Schneider, 1866) (Iannacone & Alvarino, 2002).

Of the three areas assessed, the intermediate environment had the highest prevalence of helminths. However, it is necessary to increase the number of samples in rural and urban places to see if this pattern is confirmed. Species diversity was higher in the rural area, even with low number of organisms which may be an indication that this environment actually has a higher number of parasite species.

The three species of helminths found, *S. obvelata*, *A. tetraptera*, and *H. diminuta*, have already been recorded infecting *R. rattus* in different parts of the world. *S. obvelata* and *H. diminuta* are zoonotic species.

Aspicularis tetraptera had lower prevalence and intensity in *R. rattus*, nevertheless, it is likely that this helminth parasitism is not accidental, since it has already been mentioned associated with this species (Milazzo *et al.*, 2003) and with other murine rodents (Bazzano *et al.*, 2002; Kataranovski *et al.*, 2008).

Syphacia obvelata, seems to be more associated with *Mus musculus* (Linnaeus, 1758), but it has already been observed infecting *R. rattus* (Bressan, *et al.*, 1997). *S. muris* (Yamaguti, 1935) is the species of this genus most commonly found in *R. rattus* (Bazzano *et al.*, 2002; Milazzo *et al.*, 2003). *S. obvelata* has already been mentioned infecting humans. This nematode of direct life cycle deposits its eggs in the anal region of the host, usually a rodent. Humans become infected by accidentally swallowing the eggs, which may be carried by arthropods or dust particles (Stone & Manwell, 1966).

Hymenolepis diminuta was the second most prevalent helminth. This cestode was mentioned as predominant parasite of *R. rattus* (Seng *et al.*, 1979), and is often associated with this rodent (Ajayi *et al.*, 2007). However, other species of this genus have been found parasitizing *R. rattus*, as *H. fraterna* (Mas-Coma *et al.*, 2000) and *H. nana* (Ajayi *et al.*, 2007). Other rodents of the family Muridae have been reported as hosts for *H. diminuta*, as *R. norvegicus* (Berkenhout, 1769) (Abu-Madi *et al.*, 2001) and *M. musculus* (Milazzo *et al.*, 2003), showing that this cestode has low host specificity. *H. diminuta* is cosmopolitan whose preferred definitive hosts are rodents. However, infection may occur in humans through accidental ingestion of arthropods containing the cysticercoids larvae, usually affecting children (Marangi *et al.*, 2003).

Aspicularis tetraptera, *S. obvelata*, and *H. diminuta* are record for the first time in Rio Grande do Sul State infecting non-captive populations of *R. rattus*, and the most prevalent helminth is *S. obvelata*. The report of *S. obvelata* and *H. diminuta* composing the helminth fauna of *R. rattus*, highlights the importance of these parasites in public health due to proximity between the hosts and humans, since these rodents are disseminators of these parasites.

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Received November 12, 2013.

Accepted December 23, 2013.