SHORT COMMUNICATION

ON THE HELMINTH PARASITES OF THE GENUS JACULUS (RODENTIA: DIPODIDAE) IN TUNISIA: A PRELIMINARY SURVEY STUDY

Abderraoouf Ben Faleh, Ali Annabi, Sergi López1, Khaled Said and Alexis Ribas1,2

Unité de Recherche: Génétique, Biodiversité et Valorisation des Bio-ressources, (UR 03ES09), Institut Supérieur de Biotechnologie de Monastir 5000, Tunisie
1Laboratory of Parasitology, Faculty of Pharmacy, University of Barcelona, Av. Diagonal s/n, 08028, Barcelona, Spain
2Biodiversity Research Institute (IRBIO), Faculty of Biology, University of Barcelona, Av. Diagonal 645, 08028, Barcelona, Spain

benfalahabdelraouf@yahoo.fr

(Received 28 April 2011 - Accepted 2 September 2011)

ABSTRACT

A total of 149 specimens of jerboas from different localities in Tunisia were surveyed for helminth parasites. The host species were Jaculus jaculus (n = 50), J. orientalis (n = 50) and J. deserti (n = 49). Jerboas examined herein were characterized by a poor richness of parasites where a total of three cestodes and none of nematodes and trematodes were found. The helminth cestodes recovered here were Raillietina trapezoides (Janicki, 1904), Catenotaeniidae and Inermicapsifer sp. This study was the first report on helminths of J. deserti.

Keywords: jerboas, Raillietina trapezoids, Catenotaeniidae, Inermicapsifer sp., helminths, Jaculus, parasites

INTRODUCTION

In the genus Jaculus (Erxleben, 1777), two morphologically different species J. jaculus (lesser jerboa, Linnaeus, 1758) and J. orientalis (greater jerboa, Erxleben, 1777) have long been identified. These jerboa species are found in very diverse habitats extending throughout the sub-Saharan and deserts of North Africa, Asia, and Arab countries, like Egypt, Sudan, Palestine and Morocco (Osborn & Helmy, 1980; Aulagnier & Thévenot, 1986; Brown, 1994; Kingdon, 1997; Aulagnier et al., 2009). Of these species, J. jaculus occupies deserts and semi-deserts, with burrows either in the sand or in more compact soil, while J. orientalis is more common in open landscapes such as steppe-like habitats with sandy or clayey soil, as well as coastal dunes and grassland or cultivated areas, rarely found in forests, but sometimes found at altitude in the Middle Atlas Mountains (Morocco).

In this study, the lesser jerboa J. jaculus was trapped in the desert areas, while the greater jerboa J. orientalis was found in the semiarid regions in the North (Ben Faleh et al., 2009) and Jaculus deserti (Loche, 1867) was scored in the center and south of Tunisia (Ben Faleh et al., 2010).
Previous studies on helminths in *J. jaculus* and *J. orientalis* are limited, where two nematodes *Dipetalonema viteae* (Krepkogorski, 1933) and *Syphacia obvelata* (Rudolphi, 1802) were scored in *J. orientalis* and one *S. obvelata* was described in *J. jaculus* (Bernard, 1987). The third host species *J. deserti* has not been previously studied from a helminthological point of view, as it is a recently described species (Ben Faleh et al., 2010).

Generally, little is known of helminths from the dipodid group. So the aim of the present study is to shed some light on the helminth parasites common in the jerboa occurring in Tunisia and comparing their data with that of other common species elsewhere.

**MATERIAL AND METHODS**

In this study, 149 specimens from a total of three species of jerboa: *Jaculus jaculus* (Linnaeus, 1758) (*n*= 50), *J. orientalis* (Erxleben, 1777) (*n*= 50) and *Jaculus deserti* (Loche, 1867) (*n*= 49) were surveyed for helminth parasites in Tunisia between 2005 and 2007 (Fig. 1). The jerboas examined were collected from all currently known localities of their distribution as previously described (Gharaibeh, 1997; Ben Faleh et al., 2010). Jerboas were preserved in 70% ethanol. Their digestive tract was removed and dissected in the laboratory of Parasitology, University of Barcelona. Recovered helminths were stained with Semichon acetocarmine, dehydrated in alcohol, cleared in xylene and mounted in Canada balsam. All helminths were specifically identified based on their morphology and morphometry, according to literature (Quentin, 1989).

**RESULTS**

Three species of helminths were found in the jerboas examined. *Raillietina trapezoides* (Janicki, 1904) and *Catenotaeniidae* were scored in both of *Jaculus jaculus*, *J. orientalis* and *Jaculus deserti*, while *Inermicapsifer* sp. was found only in *J. deserti* (Table 1). Of the three helminth species, the last two species were not identified in all jerboas probably due to the fact that helminths were not isolated in field.
TABLE 1
Some Statistics from the Jerboa Analyzed in the General Sample

<table>
<thead>
<tr>
<th>Host</th>
<th>Helminths</th>
<th>Nº Hosts</th>
<th>Prevalence</th>
<th>Mean intensity</th>
<th>Mean abundance (SE)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. jaculus</td>
<td>Raillietina</td>
<td>50</td>
<td>30,0%</td>
<td>3,73</td>
<td>1,12</td>
<td>1-14</td>
</tr>
<tr>
<td></td>
<td>trapezoides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catenotaeniidae</td>
<td>50</td>
<td>6,0%</td>
<td>2,66</td>
<td>0,16</td>
<td>1-2</td>
</tr>
<tr>
<td>J. orientalis</td>
<td>Raillietina</td>
<td>50</td>
<td>36,0%</td>
<td>7,05</td>
<td>2,54</td>
<td>1-45</td>
</tr>
<tr>
<td></td>
<td>trapezoides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catenotaeniidae</td>
<td>50</td>
<td>2,0%</td>
<td>1,66</td>
<td>0,10</td>
<td>3-3</td>
</tr>
<tr>
<td>J. deserti</td>
<td>Raillietina</td>
<td>49</td>
<td>32,8%</td>
<td>4,38</td>
<td>1,75</td>
<td>1-18</td>
</tr>
<tr>
<td></td>
<td>trapezoides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catenotaeniidae</td>
<td>49</td>
<td>2,0%</td>
<td>1,00</td>
<td>0,02</td>
<td>1-1</td>
</tr>
<tr>
<td></td>
<td>Inermicapsifer sp.</td>
<td>49</td>
<td>2,0%</td>
<td>33,00</td>
<td>0,67</td>
<td>33-33</td>
</tr>
</tbody>
</table>

Details of ecological parameters are given in Table 1. The general prevalence of helminths in the three species of *Jaculus* was nearly similar: 36.0% for *J. jaculus*, 38.0% for *J. orientalis* and 36.8% for *J. deserti*. The percentage values of the three species of helminths in each of the jerboa species were as follows: for *J. jaculus* (*R. trapezoides*, 30.0%; *Catenotaeniidae*, 6.0%), for *J. orientalis* (*R. trapezoides*, 36.0%; *Catenotaeniidae*, 2.0%), and finally, for *J. deserti* (*R. trapezoides*, 32.8%; *Catenotaeniidae*, 2.0% and *Inermicapsifer* sp., 2.0%). In addition, some other statistics are also shown in Table 1.

**DISCUSSION**

This is the first survey study on the helminth parasites of the jerboa species, particularly *Jaculus deserti*, common in Tunisia. The results showed that *J. jaculus* and *J. orientalis* were infected with *Raillietina trapezoides* (Janicki, 1904) and *Catenotaeniidae* while *J. deserti* was infected with three helminth species, namely, *Raillietina trapezoides*, *Catenotaeniidae* and *Inermicapsifer* sp. (Table 1). An earlier study on *Jaculus* spp. from Tunisia (Bernard, 1987) doesn’t include an ecological study. For this reason, the general prevalence reported in present study cannot be compared with other previous studies on these jerboa species. The cestode *R. trapezoides* was originally described as *Davainea trapezoides*, in “*Mus variegatus*” (*Arvicanthis niloticus*) from Egypt. However, the species has been found in Israel, in gerbilidae and dipodidae rodents: *Gerbillus* spp., *Meriones* spp., *Psammomys obesus* (Fichet-Calvet et al., 2003) and *Jaculus jaculus* (Wertheim et al., 1986). The authors added that the intermediate host(s) is unknown, but should be an arthropod according to species of the same group. In the present study, *R. trapezoides* is the dominant helminth species for the three species of jerboa studied with a general prevalence reaching between 30-36%, compared to a relatively lower prevalence percentage values for the other two reported species (Table 1), and thus confirm that this helminth parasite is a generalized species reported in several rodent hosts. The helminth fauna of *Jaculus* is very poor (only a range of 1-3 species appeared). Therefore, one assumed that the reason could be explained in view of the low diversity of parasites among populations of *Jaculus* spp. due to phylogenetic
related hosts (Klimpel et al., 2007) and the habitats where they live, like desert areas or semiarid regions, but further studies are needed to support this hypothesis.

**CONCLUSION**

The jerboas examined herein were characterized by a poor richness of parasites where a total of three cestodes and none of nematodes and trematodes were found. The helminth cestodes recovered here were *Raillietina trapezoides* (Janicki, 1904), *Catenotaeniidae* and *Inermicapsifer* sp. This study was the first report on helminths of *J. deserti* and more studies on different species of jerboas from different geographical areas are needed to shed more light on helminths of these rodent species.

**ACKNOWLEDGEMENTS**

Financial support of A. Ribas was from “Generalitat de Catalunya” 2009 SGR 403.

**REFERENCES**


