Helminth parasites of some wildlife in Asejire Game Reserve, Nigeria

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Received 11 August 2010. Accepted 4 May 2011

A study was carried out between August 2007 and January 2008 to determine the prevalence of helminth parasites of cane rats (Thryonomys swinderianus) and grey duikers (Sylvicapra grimmia) cropped from Asejire Game Reserve in Osun State, southwestern Nigeria. Totals of 93 and 13 faecal samples, respectively collected from cane rats and grey duikers, were examined for helminth parasites using sodium chloride floatation and zinc sulphate sedimentation methods. Of the 93 and 13 faecal samples examined from cane rats and grey duikers 78 (83.3%) and 7 (53.8%), respectively, were positive for helminth ova. For cane rats, Strongyle ova 71 (76.3%) was the most frequently observed followed by Strongyloides 38 (40.8%) Trichuris 33 (35.4%), Cestode 9 (9.6%) and Ascaris 5 (7.5%). For antelopes Strongyle ova 6 (46.0%) was also the most frequently encountered followed by Trichuris 4 (31.0%), Ascaris 2 (15.0%) and Cestode 1 (8.0%). Strongyloides ova were not detected in the faecal samples examined for grey duikers. No trematode ova were detected in any of the samples examined. Larvae of Haemonchus and Trichostrongylus were common to both cane rats and grey duikers faecal cultures. Cane rats carried greater worm burdens than grey duikers. The number of eggs per gram of faeces for Strongyle was the highest 390.6 ± 154.9 and 420.0 ± 1.0 for cane rats and grey duikers, respectively. We recommend health education for all the people concerned in handling the animals, including the consumers of bushmeat in whatever form.

Key words: helminths, wildlife, Nigeria.

INTRODUCTION

Nigerians are developing an interest in wildlife because of its value as a protein source. Charter (1990) reported the value of wild animal meat to be about 20% of the mean annual animal protein consumption by people in rural areas leading to increases in bushmeat hunting in both tropical and temperate regions (Hayward 2009; Wilkie & Carpenter 1999) that ultimately threatens wildlife (Fa et al. 2000; IUCN 2007; Grey-Ross et al. 2010).

Although legislation excludes poaching from game reserves, people still hunt game animals because of a lack of law enforcement and, more importantly, over 80% of Nigerians depend on wild animal meat, (‘bushmeat’) as their main source of animal protein and income (Ogunsanmi et al. 2001).

However, diseases pose considerable threat to humans who consume ‘bushmeat’. For example, helminthosis causes lesions on wildlife and negatively influences growth, productivity and fecundity of wildlife animals but also poses zoonotic threats to humans (Dipeolu 1975; Verster et al. 1979; Kruse et al. 2004). Most hunted wildlife are reservoirs of zoonotic helminths which can be transmitted through handling and/or consumption of improperly processed and half-cooked meat.

Wild animals and domestic livestock share several gastrointestinal helminths but the possible role of wildlife as a source of infection for domestic animals remains purely speculative. About 20–40% of the nematode species commonly recorded in wildlife have been found in domestic animals (Horak 1979; Graber 1980; Monnig 1983; Crockett & Dipeolu, 1984; Waruiru et al. 1995). This paper reports on the prevalence of helminths of cane rats and grey duikers in Asejire Game Reserve, Osun State, southwestern Nigeria.

METHODS

Study area

Asejire is in Irewole Local Government Area of Osun State, southwestern Nigeria at 7°21′40″N, 4°11′00″E, with over 800 000 people (Census, 1993). The town is on the major road linking the six southwestern states (Ondo, Ekiti, Osun, Oyo, Ogun and Lagos). Asejire harbours the popular Asejire Water Dam and it is a rainforest area.

Sample collection

Cane rats (Thryonomys swinderianus), also known as grass cutters and grey duikers (Sylvicapra grimmia) are widely distributed throughout the savanna and the rainforest zones of Nigeria (Asibey 1974; NRC 1991). Because of their nocturnal habit, cane rats and grey duikers are vulnerable to the hunters scotching and blinding calcium carbide-powered lamps and shots from damguns. Most killings usually occur in the early hours of the day, so the animals are brought to the hawking or processing spots fresh.

Faecal samples were collected (between August
Table 1. Results of McMaster counts and larval culture.

<table>
<thead>
<tr>
<th>Floatation method results</th>
<th>McMaster count (eggs per gram of faeces)</th>
<th>Larval culture results*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cane rats</td>
<td>Antelope</td>
</tr>
<tr>
<td>Strongyle ova</td>
<td>390.6 ± 154.9</td>
<td>420 ± 1.0</td>
</tr>
<tr>
<td>Strongyloides ova</td>
<td>315.8 ± 473.6</td>
<td>–</td>
</tr>
<tr>
<td>Trichuris ova</td>
<td>257.7 ± 857.5</td>
<td>100 ± 0</td>
</tr>
<tr>
<td>Ascaris ova</td>
<td>375.7 ± 751.7</td>
<td>200 ± 0</td>
</tr>
<tr>
<td>Cestode ova</td>
<td>271.5 ± 727.0</td>
<td>200 ± 0</td>
</tr>
</tbody>
</table>

*The numbers in brackets denote, respectively, the number of cane rats and antelopes in which the parasite was found.

2007 and January 2008) from the rectums of cropped cane rats and grey duikers into clean and dry universal glass bottles and labelled. They were thereafter taken to the Parasitology laboratory of the Department of Veterinary Microbiology and Parasitology at the University of Ibadan in insulated containers for processing and parasite identification, or stored in a refrigerator at 4°C until analysed within 48 hours.

We did not have access to the gut of animals examined because the animals were always sold intact to buyers to attract high prices, so our investigation was based only on faecal examination.

Laboratory methods
Faecal examination for helminth ova was carried out using saturated sodium chloride floatation and zinc sulphate sedimentation methods and worm burden was determined using modified a McMaster technique as described by Thiepont et al. (1979) and Urguhart et al. (1988). Samples positive for helminth ova were cultured according to the method of Sellers & Dipeolu (1975) to identify the helminth genera. Larvae from each culture were identified using the criteria described by Soulsby (1982) and Taylor et al. (2007).

Of the 93 and 13 faecal samples examined, respectively, from cane rats and grey duikers, 78 (83.3%) and 7 (53.8%) were positive for helminth ova. Helminth ova encountered were Strongyle spp., Strongyloides spp., Trichuris spp., Ascaris spp. and cestode. For cane rats, Strongyle ova (71/76.3%) were most frequently observed followed by Strongyloides (38/40.8%), Trichuris (33/35.4%), cestodes (9/9.6%) and Ascaris (5/7.5%). For grey duikers (Sylvicapra grimmia) Strongyle ova (6/46.0%) was also the most frequently encountered followed by Trichuris (4/31.0%) Ascaris (2/15.0%) and cestodes (1/8.0%). Strongyloides ova were not detected in the faecal samples examined from antelopes. No trematode ova were detected in any of the samples examined.

The larvae genera identified from faecal cultures positive for Strongyle ova were Haemonchus spp. (43; 4), and Trichostrongylus spp. (28; 2) for cane rats and grey duikers, respectively (Table 1). Cane rats carried a greater worm burden of all the helminths encountered than grey duikers.

The number of eggs per gram of faeces for Strongyle was the highest, 390.6 ± 154.9 and 420.0 ± 1.0 for cane rats and grey duikers, respectively.

DISCUSSION
We were unable to ascribe any genus to the cestode ova observed. Further investigations to clarify the cestode eggs encountered are ongoing in our laboratory.

The results of this investigation are in agreement with the findings of previous workers. The low prevalence rates and number of helminths recorded in this study for grey duikers might be due to the location of study, small number of grey duikers examined and the fact that the study was based only on faecal examination. Crockett & Dipeolu (1984) reported the occurrence of Haemonchus, Oesophagostomum, Bunostomum, Trichostrongylus, Ascaris, Strongyloides, Trichuris, Nematodirus species and trematodes in the faeces of red hartebeest (Alcelaphus buselaphus) and roan antelopes (Hippotragus equinus) in Borgu section of Kainji Lake National Park, Nigeria.

Waruiru et al. (1995) in Kenya and Boomker et al. (2000) in the Eastern and Western Cape Provinces of South Africa reported on gastrointestinal parasites in some species of antelope. The parasites, which were mainly abomasal worms,
included *Haemonchus contortus*, *H. mitchelli*, *H. bedfordi*, *Gazellostrongylus lorouxi*, *Trichostrongylus columbriformis*, *Impalaia tuberculata*, *Cooperia connochaeti*, *Paraconopertia raphiceri* and *P. serrata* (small intestine). *Agriostomum gorgonis*, *Oesophagostomum columbianum* and *Trichuris spiricollis* (caecum and large intestine).

The results of this present study, however, highlight public health concerns, since some of the helminths encountered (particularly *Trichuris* spp., *Strongyloides* spp., *Ascaris* spp.) have been reported to be zoonotic (Kruse *et al.* 2004). Consequently, all the people concerned in handling the animals and the consumers are at risk of infection. Infection with *Trichuris trichiura*, *Ancylostoma duodenale*, *Ascaris lumbricoides*, *Strongyloides stercoralis* has been reported to be endemic in southwestern Nigeria with a high prevalence in rural communities (Ayanwale *et al.* 1982; Onadeko & Ladipo 1989) and these parasites have been reported in 11 zookeepers at the University of Ibadan zoological garden (Adejinmi & Ayinmode 2008).

The study area is one of Nigeria’s regions of the lowest socio-economic standard, with people being mostly illiterate and with little or no understanding of disease processes that can help them to take simple hygienic and public health precautions.

In this area food items are very easily contaminated. As reported by Dipeolu (1977, 1980) houseflies, especially *Musca domestica* and *M. vicina*, are abundant in such native areas because of unhygienic and common practice of defecating and/or dumping excrement at refuse dumps. Flies play a substantial role in the mechanical transmission of these helminth ova and larvae in such circumstances from contaminated to fresh food. It is also not uncommon to observe bushmeat diners using their hands to eat without proper cleaning, even while meat processing is ongoing (J.O.A., pers. obs.).

The faecal examination and larval culture methods used in this study for identification of helminths from cane rats placed a limitation on the results obtained. This is because the larval culture method could not be relied upon to identify strongyle eggs to genus level in cane rats since no data are available to differentiate the larval forms of strongyles of cane rats from strongyle larval stages of ruminants. The results of this study differ from the findings of previous workers (Akamas & Enwene 2001; Yeboah & Simpson 2001; Ajayi *et al.* 2007; Opara & Fagbemi 2008) who based their studies on the identification of adult worms from gastrointestinal tracts of cane rats which were not available in this study.

The results of this study however, show that cane rats and antelopes may be very important in the epidemiology of helminthosis in domestic animals and man because cane rats and antelopes are frequently in contact with domestic animals such as cattle, sheep and goats, especially during Fulani transhumance, which is the migration of nomadic herdsman with their livestock (cattle, sheep and goats) in search of pastures and water in the dry season, from northern to southwestern Nigeria where the surviving vegetation maintains a favourable microclimate.

Also, cane rats and antelopes have been found to have a feeding range of about 50 km$^2$ (Ogunsanmi 1997) during which they come into contact with humans and their domestic animals. They also contaminate farm crops/vegetables and vegetation with faeces and urine containing eggs and larvae of helminths.

Another seemingly dangerous dimension is the possibility of direct transmission of helminths to humans through the handling and consumption of meat that has been improperly processed by hunters, hawkers and processors of bushmeat. The poor rural and elite urban dwellers depend on wildlife as a prime source of animal protein and delicacy, respectively.

However, no attention is being paid to proper hygiene in the processing and smoking of these animals. Some elite urban dwellers may adopt the western barbeque style in preparing the bushmeat in which the meat will be half-cooked, thereby exposing themselves to organisms in infected animals.

We therefore recommend health education to hunters, hawkers, processer and consumers of bushmeat in whatever form.

The authors thank Wale Odeniyi, the head of hunters, and all the hunters in Asejire for allowing us to collect faecal samples from their cropped animals, as well as J.O. Olanrele and Gbemileke Bolade for their technical assistance.

**REFERENCES**


