Annals of Parasitology 2022, 68(3), 623–629
doi: 10.17420/ap6803.469

Short note

Intestinal helminth parasites of greater cane rats (*Thryonomys swinderianus*) sold at Omagwa Bushmeat Market, Omagwa, Rivers State, Nigeria

Chidinma C. AMUZIE, Patience NWAFOR, Belema ROBERT, Godfrey C. AKANI

Department of Animal and Environmental Biology, Rivers State University, Port Harcourt, Nigeria

Corresponding Author: Chidinma C. Amuzie; e-mail: ekeh.chidinma@ust.edu.ng

ABSTRACT. Greater cane rats (*Thryonomys swinderianus*) are important sources of bushmeat in southern Nigeria. Here, we collected and examined intestinal helminth parasites of these rats sold at Omagwa bushmeat market, Rivers State, Nigeria. Twelve intestinal tracts of *T. swinderianus* were purchased from December, 2020 to February, 2021, and transported to the laboratory for examination. Each sample was incised and its contents examined in 0.9% normal saline solution. Parasites encountered were washed in same solution, fixed in 70% ethanol and subsequently identified using taxonomical keys. Prevalence of infection was computed using standard formula for computing parasite ecological parameters. Four parasitic nematodes were isolated. *Oesophagostomum venulosum* and *Strongylus* sp. infected six hosts each accounting for a prevalence of 50.0%. Mean intensity of infection was about 12 parasites/infected host for *O. venulosum* and about 7 parasites/infected host for *Strongylus* sp. *Trichuris paravispicularis* had a prevalence of 33.3% and mean intensity of about two parasites/infected host, while *Toxocara vitulorum* was recovered as a single individual from one host at a prevalence of 8.3%. We conclude that *T. swinderianus* serves as host to intestinal nematode parasites, and recommend full parasitological investigation of the animal, where possible, to isolate and identify other helminth parasites not reported in the present research.

Keywords: cane rats, *Thryonomys swinderianus,* bushmeat market, parasitic nematodes

Introduction

Greater cane rats (*Thryonomys swinderianus*), also referred to as grasscutters, are thryonomyds endemic to Africa [1]. They got the name ‘cane rats’ from the devastation they wreck on sugarcane plantations. They are commonly encountered in the rain forest zones of Nigeria, where they destroy crops (especially cassava) and are often hunted for bushmeat, which is a local delicacy. They are therefore, commonly found among the catches of hunters and in bushmeat markets [2].

Though researchers have continued to advocate the domestication of these organisms or their conservation in the wild [3,4], illegal hunting of these species remains a challenge. In parts of southern Nigeria, they are used in ethno-medical practices thereby increasing the demand already placed on them for meat [5,6]. Successful domestication of cane rats will not only require research into their ecological requirements but also knowledge of parasites and arthropod pests that reduce their health and vigor. Domestication of cane rats is considered as an important conservation measure aimed at sparing the wild population from poaching [1].

Bushmeat (or more appropriately, wild meat) markets are springing up in several parts of Africa providing a meeting point for hunters and buyers. The species of animals encountered in such markets vary, depending on the geographical location, portraying the dominant, and occasionally, rare, animals of such locations [7,8]. The Omagwa bushmeat market located at Omagwa, Ikwerre Local Government Area, Rivers State, Nigeria, boasts of a wide variety of bushmeat from animals including

Table 1. Prevalence and mean intensity of parasite infection in greater cane rats (*Thryonomys swinderianus*) in Omagwa Bushmeat Market, Rivers State, Nigeria

Parasite species	No. of infected hosts	Location in host	Prevalence (%)	Mean intensity
*Oesophagostomum venulosu*m	6	large intestine	50.0	12.2
Strongylus sp.	6	small intestine	50.0	6.7
Trichuris paravispicularis	4	small intestine	33.3	1.8
Toxocara vitulorum	1	small intestine	8.3	1.0

sitatunga (*Tragelaphus spekii*), brush-tailed porcupine (*Atherurus africanus*), tortoise (*Centrochelys sulcata*), different species of snakes, greater cane rats (*Thryonomys swinderianus*) and others. In a report by Nzeako et al. [2], *T. swinderianus* had the highest monthly abundance of all animals brought to this bushmeat market. Traders in these markets are often abreast with complaints from the hunters especially as it concerns the difficulty with finding and capturing some species; which is a result of uncontrolled hunting [8].

Greater cane rats have been shown to serve as hosts to several parasitic and protozoan infections [9–12] harbouring organisms such as *Ascaris* sp., *Hymenolepis* sp., *Entamoeba* sp., *Salmonella* sp., *Babesia* sp., *Trypanosoma* sp. etc. Studies have shown that these host organisms could harbour zoonotic organisms [11] and their production could be limited by these infections [10]. Moreover, further investigations could reveal new parasitic species which is important both 'for grasscutter production and human health' [11].

In this study, we examined the intestinal tracts of carcasses of greater cane rats sold at Omagwa Bushmeat Market, Omagwa, Rivers State, Nigeria, for endo-helminthic infections.

Materials and Methods

Study area

All samples were purchased from Omagwa Bushmeat Market, Omagwa, Ikwerre Local Government Area, Rivers State, Nigeria. The Omagwa Bushmeat Market is located between 4°58'5″N and 6°41'20″E. The climate is warm and humid tropical rainforest type; rains commence in late April or early May with a break usually in August. The rains continue through September to early October. Dry season commences in October through March. Temperature ranges from 26°C to 32°C and annual humidity is 85% during the rainy season [13].

The main activities of the people are cassava and vegetable farming, hunting, public transportation of people and goods, and petty trading in domestic and household needs.

Sampling protocol

The intestinal tracts of twelve samples were purchased from traders at the bushmeat market from December, 2020 to February, 2021. Each segment (small or large intestine) of each sample was ligated before the sample was transported in a clean cellophane bag, to the laboratory for examination within 3 hours of collection.

Laboratory examination

In the lab, small and large intestines were sectioned and samples were incised longitudinally. Portions of the content were scooped into Petri dishes containing 0.9% normal saline solution, and observed directly and under the microscope at ×10 and ×40 objectives. Parasites were extracted using forceps, cleared in lactophenol and observed under the microscope. Parasite identification was accomplished using keys from [14–16]. Photomicrographs of the parasites were taken using a Nikon digital camera (Coolpix A100, produced in 2016 by Nikon, USA) attached to the objective lens of the microscope.

Statistical analysis

Results obtained were used to compute the parasite ecological parameters of prevalence and mean intensity according to Bush et al. [17].

Results and Discussion

The parasites, *Oesophagostomum venulosum*, from the large intestine, *Strongylus* sp., *Toxocara vitulorum* and *Trichuris paravispicularis*, from the

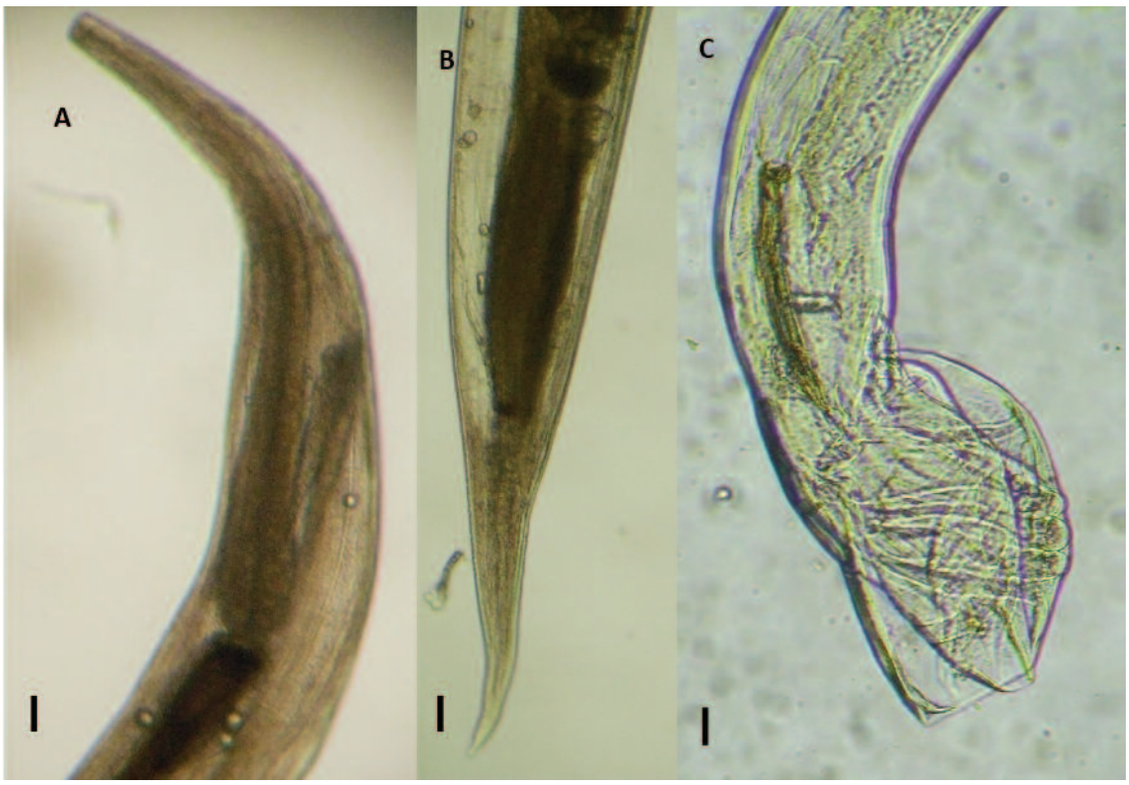

Figure 1. *Oesophagostomum venulosum*. A: anterior end; B: tail of female; C: tail of male. Scale: 0.5 mm

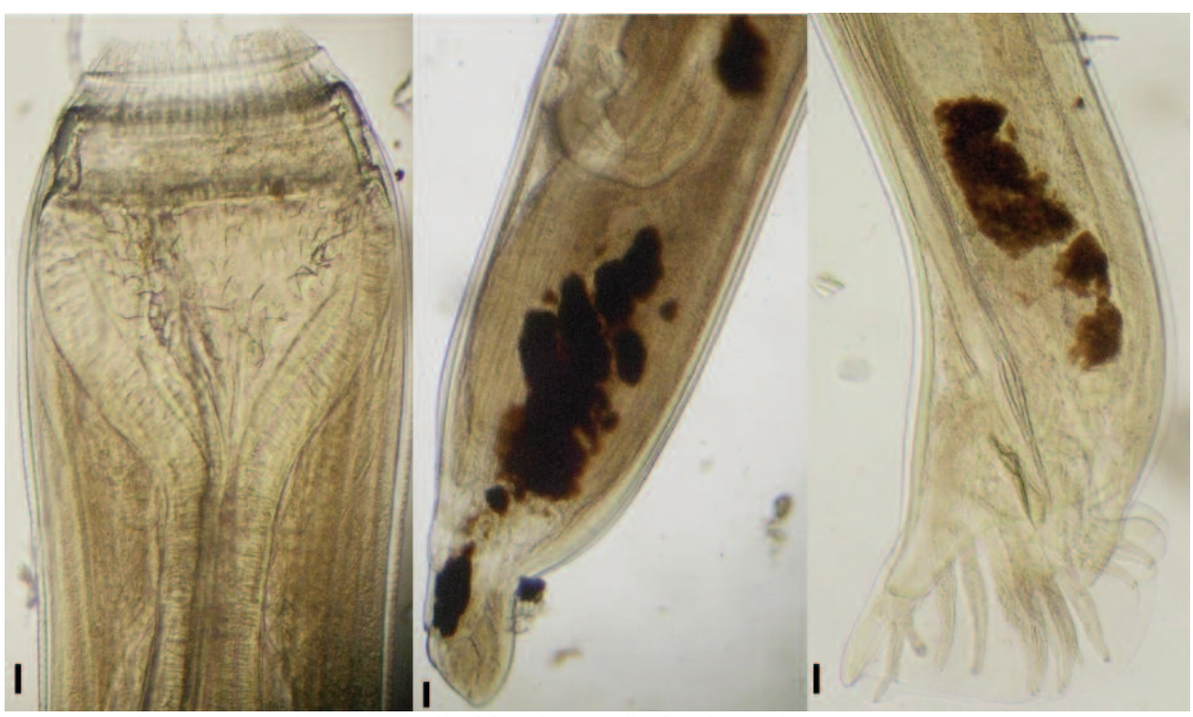

Figure 2. *Strongylus* sp. A: anterior end; B: tail of female; C: tail of male. Scale: 0.5 mm

small intestine, were isolated from ten infected samples (prevalence of 83.3%). Both *O. venulosum* and *Strongylus* sp. infected six hosts accounting for a prevalence of 50.0%. Mean intensity of infection was about 12 parasites per infected hosts for *O. venulosum* and about 7 parasites per infected hosts for *Strongylus* sp. *Trichuris paravispicularis* infected only four hosts at a mean intensity of about

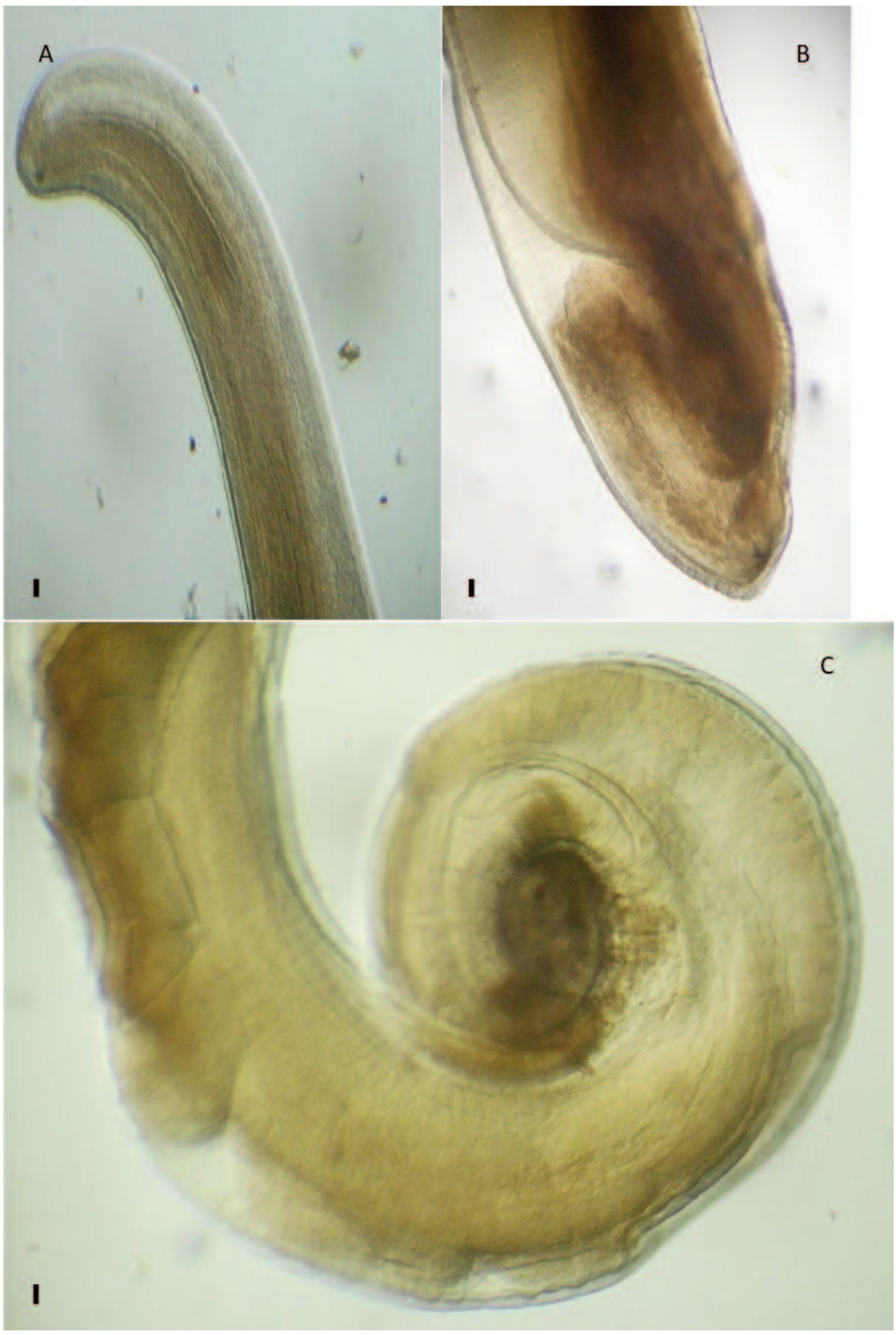

Figure 3. *Trichuris paravispicularis.* A: anterior end; B: tail of female; C: tail of male.
Scale: 0.5 mm

two parasites per infected host, while *Toxocara vitulorum* was recovered as a single individual from only one host (Tab. 1). Photomicrographs of the parasites are presented as figures 1 to 4.

Aboagye et al. [18] reported *Thryonomys swinderianus* had the highest overall prevalence (56.10%) of helminthic infections of the wild animals (*Philantomba maxwellii*, *Thryonomys swinderianus*, *Tragelaphus scriptus*, and *Neotragus pygmaeus*) examined. These authors reported the following helminths: *Haemonchus* sp., *Trichostrongylus* sp., *Ascaris* sp., *Moniezia* sp., *Schistosoma* sp. and *Trichuris* sp., with *Trichostrongylus* sp. being the most prevalent. This, in addition to other

researches [9–11], are evident of the susceptibility of *T. swinderianus* to helminthic infections.

In the present research, only nematodes were isolated namely, *Oesophagostomum venulosum*, *Strongylus* sp., *Toxocara vitulorum*, and *Trichuris paravispicularis*, with *Oesophagostomum venulosum* and *Strongylus* sp. both having the highest prevalence of 50.0% each. It is possible that these nematode parasites thrive in the intestine where the abundant cassava meal consumed by the hosts have been broken down into simple sugars (glucose) and the gut pH is favourable. In a similar research, Abara et al. [19] reported *Ascaris* sp., *Strongyloides* sp., *Taenia* sp., hookworm, *Trichuris* sp. and *Moniliformis* sp. from faecal and intestinal samples of grasscutters, *Thryonomys swinderianus*, supplied to bushmeat bars at Omagwa, Rivers State, Nigeria. In their research, *Ascaris* sp. had the highest level of occurrence. These authors reported that some of these parasites could be accidentally transferred to man.

Though *Oesophagostomum* species are generally non-pathogenic, larval migration elicits the production of nodules on the walls of the large intestine which may affect digestion and lead to enteritis [20,21]. This could be fatal in younger animals.

Most animals infected with *Trichuris* species appear asymptomatic, but severe infections can occur [22]. Heavy worm burdens may cause diarrhea and weight loss.

Strongylus species may affect animals of any age group and the larval migratory phase causes arterial damage. Internal hemorrhage, thrombosis and embolism could also result from these parasites as well as anaemia [23].

Taxocara vitulorum has been reported to cause intestinal obstruction in a calf [24]. This occurrence if untreated would result in death. Mild infections are however, asymptomatic.

These nematode parasites can be treated with a wide range of anthelminthic drugs (including ivermectin, albendazole and other benzimidazoles) [20,25]. However, the services of a veterinary doctor should be employed as uncontrolled use of these drugs has led to increasing levels of anthelminthic resistance in farm animals [20]. Since these parasites also have a direct life cycle requiring the soil or vegetation, appropriate hygienic practices including removal of contaminated or excess feed and disinfection and cleaning of rearing pens should be practiced regularly.

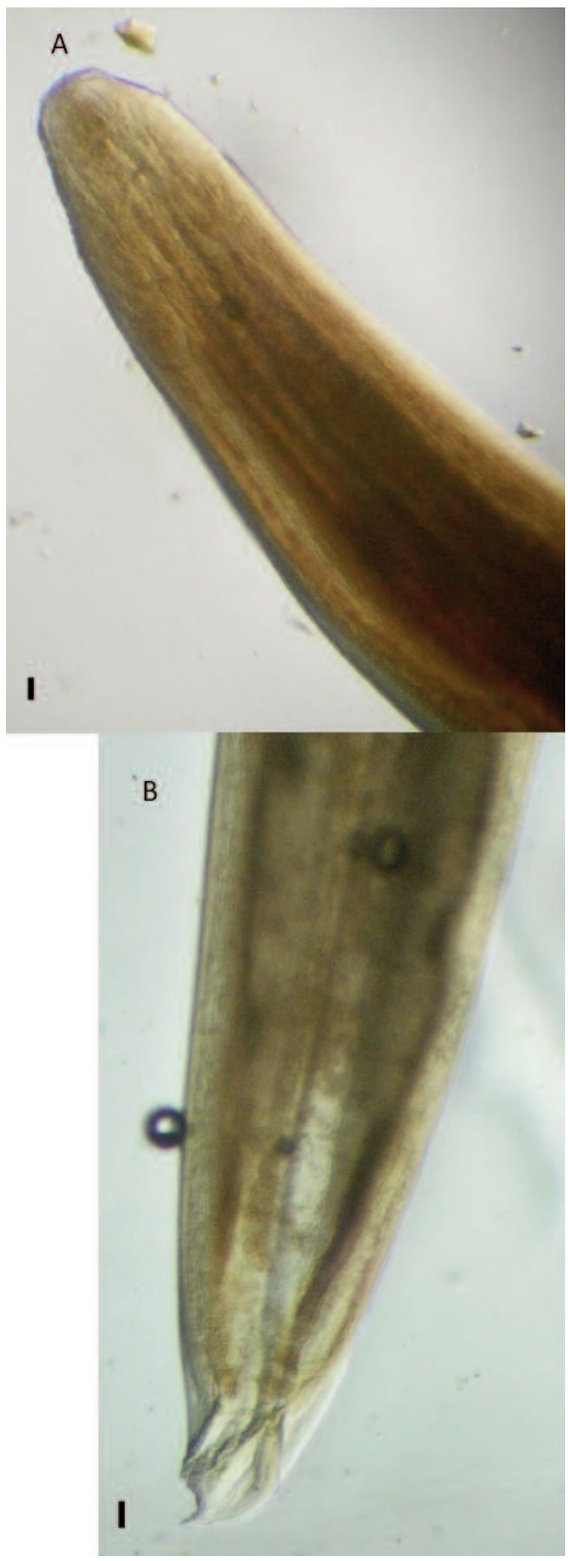

Figure 4. *Toxocara vitulorum*. A: anterior end; B: posterior end. Scale: 0.5 mm

It is concluded that *T. swinderianus* is the definitive host of some nematode parasites (including, *Oesophagostomum venulosum*, *Strongylus* sp., *Toxocara vitulorum* and *Trichuris*

paravispicularis) and its conservation by domestication or in the wild would require deworming regimens using appropriate anthelminthic drugs and hygienic practices to ensure their health.

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Received 01 May 2022
Accepted 30 June 2022