PRELIMINARY STUDIES OF THE HELMINTH PARASITES OF *LIMICOLARIA AURORA* IN ILE-IFE, NIGERIA

O.A. SOWEMIMO+ and S.O. ASAOLU
Department of Zoology, Obafemi Awolowo University, Ile-Ife, Nigeria.

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Abstract

Specimens of *Limicolaria aurora* collected from Ile-Ife area were surveyed for infection with parasitic helminthes. The snails were picked from bushes and dissected and examined in the laboratory. Four different helminth parasites comprising of 3 nematodes and a digenetic trematode were observed in *L. aurora*. The nematodes include the larvae of *Angiostrongylus cantonensis*, the unidentified Nematode I and another unidentified nematode (Nematode II). Prevalences were 25.3% for *A. cantonensis*, 4.7% for Nematode I and 2.0% for Nematode II. The mean intensities of infection for the three nematodes were 12.4±3.7, 1.3±0.1 and 3.0 respectively. The trematode, which is yet unidentified has a prevalence of 80.7% and mean intensity of 53.7±7.5.

Keywords: *Limicolaria aurora, Angiostrongylus cantonensis*, prevalence, trematode.

1. Introduction

Snails serve as sources of protein and a number of gastropod species are used for food by people in many parts of the world (Barnes, 1987). Snail meat is high in protein (14.32%) and water (76.51%) but low in fat (0.279%) (Mead, 1961).

Limicolaria aurora is one of the terrestrial gastropods living in Africa (Segun, 1989). It is referred to as the Nigeria garden snail. It is a thin-shelled species occurring in four chromomorphs. The shell has a length of about 48 mm (Reid, 1991). *L. aurora* is among the species of mollusks which is eaten by many people in Nigeria. This species is economically important and is relatively an inexpensive protein source. *L. aurora* is also considered as crop pest (Reid, 1991).

However, in spite of the usage of this species for food, information on the parasitic fauna of *L. aurora* is generally lacking. This study examines the helminth infections in this snail species.

2. Materials and Methods

150 specimens of *L. aurora* examined in this study were picked from bushes and lawns from different locations within Ile-Ife and environs. The snails were brought into the laboratory in well aerated cages and examined for helminth parasites. Each snail was given an identification number. The length and weight of the snails were taken. The snail was dissected open and the various organs removed into saline solution (0.85%) in separate petri-dishes and then examined for helminth parasites. The shell was broken and various organs which include the oesophagus, crop, stomach, intestine, hepatopancreas, lung, (vascularised mantle), heart and the rectum were removed. Each organ was carefully opened by a longitudinal cut and the content expressed in saline (0.85%). The content was then examined on a dark background under the dissecting microscope.

The foot of the snail was chopped, macerated in saline (0.85%) and left for 24 hours at room temperature. The chopped pieces were then removed and the liquid centrifuged at 1,500rpm for 3 mins. After decanting the supernatant, the sediment was collected and examined under a dissecting microscope for helminth parasites. The nematode and digenetic trematode observed were counted and their number recorded. Some of the nematodes were fixed in A.F.A. (alcohol formo acetic), cleared and mounted in lactophenol on clean glass slides and covered with cover slips. The parasites were later identified using the method of Bhaibulaya (1968). The digenetic trematodes were placed in hot water at 60 °C for 15 mins and then preserved in A.F.A. They were then stained in acetic haematoxylin for about 10mins and then destained in acid alcohol. The trematodes were differentiated in 45% acetic acid and then transferred to glacial acetic acid for 10-15 mins for dehydration. The parasite was then cleared in 3:1, 1:1 and 1:3 series of mixture

+ *corresponding author* (email: yomi_showemimo@yahoo.com)

of glacial acetic acid and methyl salicylate (the time spent in each liquid was about 10-15 mins). The parasite was then mounted in Canada balsam on a clean glass slide and covered with cover slip. The parasite was later examined with light microscope.

3. Results

A total of 124 (82.7%) out of 150 specimens of *L. aurora* examined were observed to be infected with helminth parasites. Four different helminth parasites were recovered, these include the larvae of *Angiostrongylus cantonensis*, the unidentified Nematode I and another unidentified Nematode II and the unidentified digenetic trematode. The prevalence rate of *A. cantonensis* was 25.3%, 4.7% was recorded for Nematode I while 2.0% of the snails were found to be infected with Nematode II. The unidentified digenetic trematode has a prevalent rate of 80.7%. The mean intensities of infection for the three nematodes were 12.4±3.7, 1.3±0.1 and 3.0 respectively, while the mean intensity for the trematode was 53.7±7.5.

The prevalence of *A. cantonensis* in *L. aurora* was highest (33%) in snails of length size 3.6-3.8 cm and gradually fell as the length of the snail increases (Fig. 1a). However, the intensity was at a peak in medium size snails and fell as the length of the snail increases (Fig.1b).

The prevalence of the unidentified trematode in *L. aurora* was 44% in snails of length 3.3-3.5 cm increasing to a peak of 92% in the length class 3.9-4.1 cm and steadily decreases as the length increases (Fig. 2a). The intensity appears to follow a similar pattern with a mean worm burden of 28 in snails of size 3.0-3.2 cm rising to a peak of 84 worms in snails

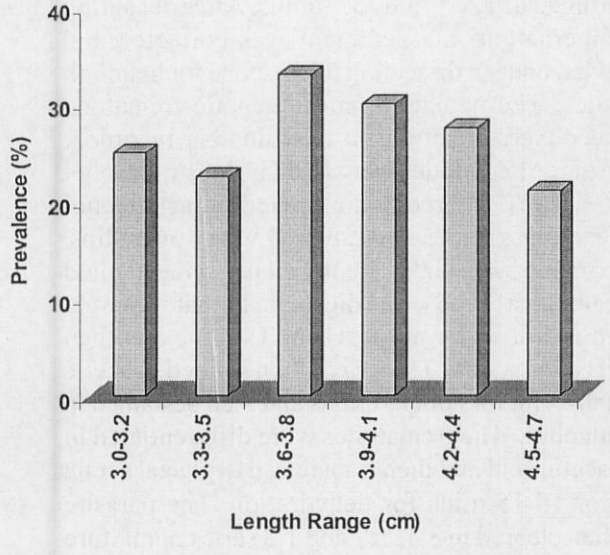

Fig. 1a: Prevalence of *A. cantonensis* infection relative to host length in *L. aurora*

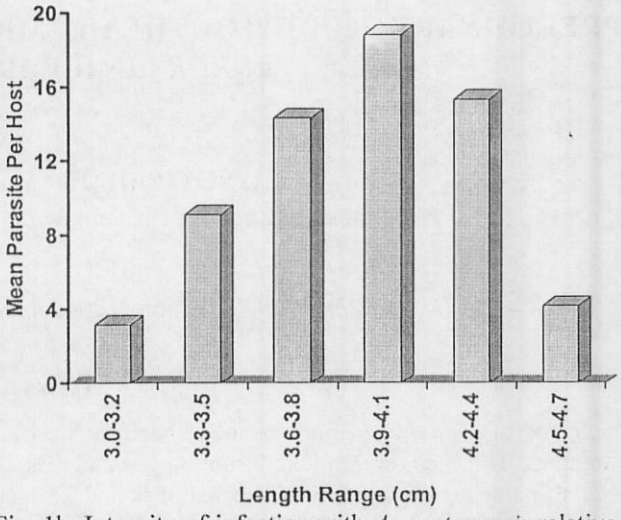

Fig. 1b: Intensity of infection with *A. cantonensis* relative to host length in *L. aurora*

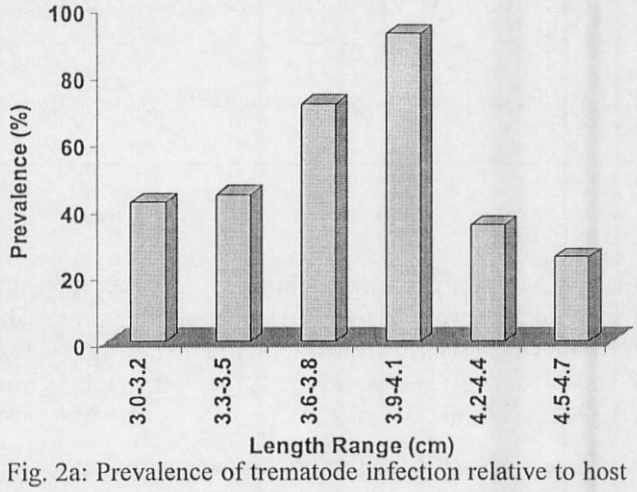

Fig. 2a: Prevalence of trematode infection relative to host length in *L. aurora*

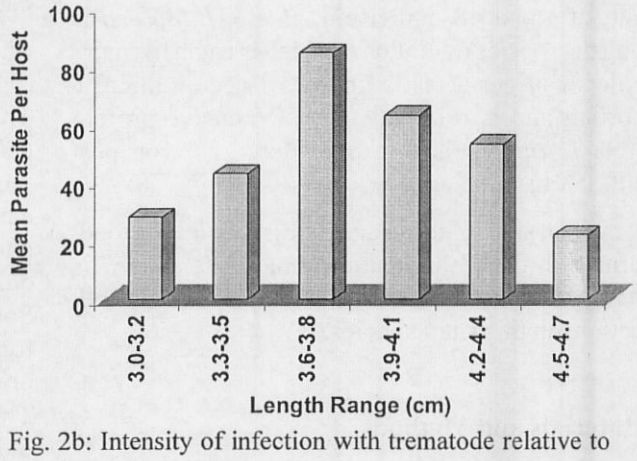

Fig. 2b: Intensity of infection with trematode relative to host length in *L. aurora*

of length 3.6-3.8 cm and decreasing steadily as the length of the snail increases (Fig. 2b).

Mixed Infection with different Species of Helminths

Out of the 124 specimens of *L. aurora* infected, 23 snails had double infections with *A. cantonensis* and

digenetic trematode, 7 snails had mixed infections with 3 parasite species namely, *A. cantonensis*, Nematode I and digenetic trematodes. Another 3 specimens of *L. aurora* also had infections with 3 parasite species, *A. cantonensis*, Nematode II and digenetic trematode.

4. Discussion

The investigations carried out in this study have revealed that at Ile-Ife, *L. aurora* is parasitised by four helminth species. One of the nematodes recovered was identified as the larva of *A. cantonensis*. This observation confirmed the findings of earlier workers that *L. aurora* is one of the intermediate hosts of *A. cantonensis* (Alicata, 1965). Attempts were made to identify the other two nematodes, Nematode I and Nematode II and the digenetic trematode recovered from *L. aurora* but was unsuccessful. The specimens were sent to the Natural History Museum in London, but the identification could not be confirmed due to the fact that they were larval forms.

Mead (1961) pointed out that *L. aurora* is ubiquitous during the rainy season and has the habit of aggregating in moist environment. This probably explains why the snail was infected with a trematode because of its association with water. Studies have revealed that snails which are associated with water, for example *Bulinus* sp. and *Lymnaea* sp. are commonly found to serve as intermediate hosts for trematode parasites.

Anderson *et al.* (1982) reported that snail susceptibility to parasitic infection declines as host size and age increased and that this has important implications for the interpretation of age-prevalence patterns observed in natural snail population. Further, they reported a decline in the prevalence of infection of *Biomphalaria glabrata* and *Schistosoma mansoni* in older age classes of snails (when compared with snails of intermediate age) in a variety of natural habitat. Similar observation was recorded in this present study where the prevalences of *A. cantonensis* and the unidentified trematode in the snail *L. aurora* after reaching the peak in medium size snail fell in larger snails (snails of older age classes).

From the result of the present study, it was observed that the mean intensity of *A. cantonensis* and the unidentified trematode rose to a peak value in medium size snail decreasing in the large size snail in *L. aurora*. This is in agreement with the findings of Anderson and Gordon (1982) who also observed that the maximum mean parasite burden occurs in host of intermediary age classes, as a result of the more rapid death of heavily infected hosts. Multiple infections with helminth parasites have been reported to be common among animals. Several authors have reported that snails in nature may be infected with more than one species of trematode. Lie *et al.* (1968) reported the interactions between larval trematodes of two different species within single snail host. Basch *et al.* (1969) also reported double infection of *Cotylurus lutzi* (Strigeidae) and *Schistosoma. mansoni* (Schistomatidae) in the snail *Bulinus glabrata.* In the present study similar observation was recorded in which the snail *L. aurora* carry triple infection with either unidentified nematode I or Nematode II, *A. cantonensis* and *digenetic* trematode.

This study is a preliminary investigation and further studies are being undertaken in an attempt to trace the life cycles of the parasites to the adult stages in their definitive hosts.

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