

AQUATIC SNAIL SPECIES OF TWO ADJOINING RIVERS IN OWERRI, IMO STATE, SOUTHEASTERN NIGERIA

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ABSTRACT

*Aquatic snail species of two adjoining Rivers (Otamiri and Nwaorie Rivers) in Owerri Southeastern Nigeria was surveyed between December 2008 and May 2009. The study identified 231 aquatic snail species. Snail species collected were *Bulinus globosus* (29.9%), *Lymnaea natalensis* (59.3%), and *Melanooides* sp. (10.8%). There was an observed statistical difference ($P < 0.05$) in the occurrence of the snail species. Otamiri River recorded 93.3% species while Nwaorie recorded 6.1% - a significant difference ($P < 0.05$) also existed. Of the total number of snail species collected, none was found shedding cercariae. Therefore, surveillance is needed to avoid emergence of diseases vectored by this snail species in the study area.*

Keywords: Aquatic snail species, *Bulinus globosus*, *Lymnaea natalensis*, *Melanooides* sp, Otamiri and Nwaorie rivers

INTRODUCTION

The various economic and social benefits resulting from the use of rivers cannot be over accentuated. These include irrigation, fishing, sporting, recreation, navigation and hydroelectric power generation. Sometimes, these changes occur in water bodies where some of these diseases especially schistosomiasis were previously unknown (Ofoezie *et al.*, 1991; 1997). Several factors are considered as affecting the ecology of snails and other intermediate hosts of diseases, hence their focal and seasonal distributions.

Snails are very important in parasite transmission especially helminthes. These snails serve as hosts for the intermediate stages of most helminthes. Water contact activities and traditional agricultural practises are reported as factors in the distribution of the disease and its snail vectors (Udonsi, 1990).

Prior to the recent studies on urinary schistosomiasis (Okoli and Iwuala, 2001; 2005; Okoli *et al.*, 2006), only the report of Oldenburg in 1942 on the prevalence of the disease in Owerri area of the present Imo State was available in literature (Udonsi, 1990). Since these recent studies revealed the endemicity of the disease in Imo State, there is the need to carry out a detailed investigation on the spread of the disease in the State.

Sequel to the current dredging of the Nwaorie River by the Imo State Government for recreational purposes, this study was conducted to document aquatic snail species of the two adjoining rivers and to identify the existence of disease spreading snail vectors in the area.

MATERIALS AND METHODS

Study Area: Nwaorie and Otamiri Rivers are two adjoining Rivers in Owerri. The rivers are

located between latitude 5°29'N and longitude 7°01'E and latitude 5°32'N, and longitude 7°00'E with relative humidity of about 75%, reaching 85% during the rainy season. The temperature ranges from 20°C to 30°C. The climate is tropical with distinct rainy season (April – October) and dry season (November – March). Their tributary is located at Nekede in Owerri West Local Government Area (LGA). Nwaorie River runs across Owerri Municipality from its origin at Egbeada in Mbaitoli LGA to its tributary at Otamiri River. Otamiri River emanated from Egbu in Owerri North LGA, runs across some parts of Owerri Municipal, Nekede and heads to Port Harcourt. There is currently a massive project by the Imo State Government to dredge Nwaorie River which runs across the municipal for recreational use.

Aquatic Snail Sampling: Collection of snails was done between December 2008 and May, 2009. Snails were mostly found on the side of the leaves and water lilies. Two sampling techniques were used; the scoop net method, which involves sampling a fixed area for a standard time. The other was the hand picking techniques from vegetation using gloves to avoid infection with infective cercariae, which involves searching for snail for a fixed period of time in a fixed area. A minimum of 15 minutes was spent on each site. Snails found were placed in wide mouthed plastic buckets and taken to the laboratory for identification.

Snail Identification: Collected snails were identified using the field guide from the Danish Bilharziasis Laboratory Denmark (DBL, 1978).

Cercariae Shedding: After identification, snail species collected were observed for cercariae shedding after exposure to sunlight for 3 hours (Okoli and Iwuala, 2001).

Statistical Analysis: Chi-square (χ^2) was used to analyze the data statistically.

RESULTS

Eight out of the nine sampling points were infested with various snail species. The snails

collected include *Bulinus globosus*, *Lymnaea natalensis* and *Melanooides* sp. The total number of snails sampled was 231. The distribution of snail species in the sampled rivers revealed the preponderance of snail species such as: *B. globosus* (29.9%), *L. natalensis* (59.3%) and *Melanooides* sp. (10.8%) (Table 1). There was significance difference in snail prevalence ($P < 0.05$). Otamiri River recorded 93.3% species composition while Nwaorie River recorded 6.1%.

The number of snails species recovered from each of the sampled sections of the rivers indicated that Otamiri River section I had the highest number of snail species, followed by sections II, III, V and IV. While in Nwaorie River, section III had the highest snail species followed by sections I and II (Table 2). No cercaria was recovered from the snails after exposure to light.

DISCUSSION

The study showed that Otamiri and Nwaorie Rivers have substantial population of aquatic snails. The study was able to identify three genera of aquatic gastropod molluscs: *Bulinus*, *Lymnaea* and *Melanooides*. The study showed that the dominant species was *Lymnaea natalensis*, known for its potential as a host for *Fasciola hepatica* in the tropics. Our finding was in line with the findings of Emejulu *et al.* (1992), who had earlier observed five genera of snail coexisting in Agulu Lake, Anambra State, Nigeria.

The presence of *Bulinus globosus* is of public health importance. Several studies have identified this species as an important vector for schistosomiasis (Ofoezie, 1999; Owojori *et al.*, 2006; Ekwunife *et al.*, 2008), although in our study no cercaria was recovered. This finding was in line with that of Anya and Okafor (1986) who showed that in the more northerly habitats of Ichielu LGA, *B. globosus* was the snail host of *Schistosoma haematobium*. *Melanooides* sp has been reported as a competitor snail with *Biomphalaria pfeifferi* (Owojori *et al.*, 2006). *Melanooides tuberculata* colonized rapidly after

Table 1: Distribution of snail species in Otamiri and Nwaorie Rivers

Snails sp	Otamiri River n (%)	Nwaorie Rivers n (%)	Total (%)
<i>Bulinus globosus</i>	69 (29.9)	0 (0.0)	69 (29.9)
<i>Lymnaea natalensis</i>	135 (58.4)	2 (0.9)	137 (59.3)
<i>Melanooides sp</i>	13 (5.6)	12 (5.2)	25 (10.8)
Total	217 (93.3)	14 (6.1)	231 (100.0)

Table 2: Abundance of snail species along sampled sections of the rivers

Snails sp	Otamiri Rivers Section					Nwaorie Rivers Section				Total
	I	II	III	IV	V	I	II	III	IV	
<i>Bulinus globosus</i>	5	23	11	9	21	0	0	0	0	69
<i>Lymnaea natalensis</i>	88	11	20	7	9	0	2	0	0	137
<i>Melanooides sp</i>	6	3	4	0	0	5	0	7	0	25
Total	99	37	35	16	30	5	2	7	0	231

its introduction in January 1983, and by October 1984, *Biomphalaria glabrata* and *B. straminea* had disappeared and have not been found since (Schmidt and Roberts, 2000). This could possibly be the reason why *Biomphalaria* sp was lacking in the study area.

It is worthy to note that this was the first study to identify these snail species in the study area. Therefore, surveillance is needed to avoid emergence of diseases associated with the snail species in the study area. Previous studies had revealed the prevalence of Schistosomiasis in Imo State (Okoli and Iwuala 2001; 2005; Okoli *et al.*, 2006). Some of the Local Government Areas they studied are in close proximity with Owerri, thus indicating a likelihood of these rivers transmitting parasitic trematode to the study area.

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