SNAIL INTERMEDIATE HOST OF HUMAN SCHISTOSOMASIS IN MUBI NORTH AND SOUTH LOCAL GOVERNMENT AREAS OF ADAMAWA STATE NIGERIA

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ABSTRACT

A survey of snail intermediate host of human schistosomasis was carried out within a period of six months in eight randomly selected ponds from Mubi North and South local government areas of Adamawa State. The study was conducted from the months of May to October 2002. A total of 554 snails consisting mainly of Bulinus, globosus 179(32.3), Bulinus forskali 75(13.5), Biomphalaria pfeifferi 220(39.7) and Lymnaea natalensis 80(14.4) were collected. Infectivity rate was determined in Biomphalaria pfeifferi and Bulinus globosus. Of the 224 snail examined, 57 (25.5%) were found to shed schistosoma cercaria of which 32(14.3%) were identified as Bulinus globosus and 25(11.2%) as Bimomphalaria pfeifferi. The highest infection rate for Bulinus globosus was recorded between April to June 7(21.9), 7(21.9) and 6(18.8) respectively. While that of Biomphalaria pfeifferi were recorded between the months of May and July,4(16.0%), & 6(24.0%) respectively. It was also observed that during hot weather, children were seen frequenting the ponds particularly after school hours for cool bath and as a result get infected, or further contaminate the water bodies. The result of this work suggests that, Mubi residents and their animals are at risk of infection with schistosomasis hence the need for preventive measures to be taken by the authorities concern.

Key words: cercariae schistosomiasis, infectivity, molluscicides Biomphalaria pfeifferi.

INTRODUCTION:

Aquatic snails of the order gastropoda are of medical importance because they act as intermediate hosts for different species of *schistosoma* that cause a disease known as schistosomiasis, This is a common disease in tropical agricultural communities WHO (2009). Schistosomiasis, also known as bilhaziasis is a parasitic disease that leads to chronic ill health. (Nnoruka 1999). The disease is one of the most wide spread parasitic diseases that put about 400-600 million people world wide at risk, while 200 million are already infected C.D.C. (2008). In Nigeria, studies revealed a wide distribution of the disease with numerous endemic foci particularly in reverine areas where infection rate as high as 90% have been recorded Adewumi et.al; (1993). *Biomphalaria* and *Bulinus* species of sanils indicated in the transmission of human schistosomiasis (Brown 1990). These two generals of snails are aquatic and hermaphroditic. They are found in almost all types of water bodies, ranging from small temporary ponds or steams to large lakes and rivers. Man made lakes or water bodies like irrigation canals and dams are in particular, excellent habitats. In Adamawa State the emphasis on Agriculture and the accompanying of new irrigation schemes inform of canals dams example the Kiri dam, Savannah Sugar Company canals, new drinking ponds for nomadic cattles in most local government areas of Adamawa State which provides

conducive habitats and breeding grounds for snails has led to an increase in prevalence of schistosomiasis in Mubi and it's environs.

The lacke of attention giving to schistosomiasis may as a results of non availability of basic information on particular areas. Information on local Trematodes of African fresh water snails and their description of the type of cercaria is rare in Nigeria (Akogun 1990). This study is aimed at determining the relative abundance of the snails and infectivity rate.

MATERIALS AND METHOD

STUDY AREA:

Mubi North and South are two related local government areas in Adamawa State. They are situated on the latitude 10^{O} $10^{1}25^{11}$N and Longitude $13^{0}10^{1}40^{11}$E on the Altitude 579 and 580 meters above sea level, Adebayo; (1999). Mubi is the second largest city in the state at a distance of 142km from the State Capital Yola. Mubi was known to be the provincial capital of former Sardauna province and situated at lower contour of Mandara Mountains separating Nigeria from Cameroon. Adebayo; (1999), Ministry of Land and Survey Mubi; (2000).

The sampling areas are Biyama, Digil, Sabon gari and Tafki in Mubi North and Daskarew, Geruwel, Manduva and Sebore are in Mubi South L.G.As.

SOURCES OF SNAILS

Snails were collected along the edges of ponds in the 8 different sites namely, Biyama, Daskarew, Digil.and Geruwel in Mubi North and Mandova, Sabongari, Sebore, Tafki in Mubi South Local Areas.

Snails were collected with the aid of a long handled snail net and were transported to the laboratory in wide-mouthed plastic containers containing some vegetation but no water. In the laboratory, samples from each site were transferred into separate glass aquaria containing de-chlorinated water and some washed sand and gravel. Some life specimens of *Claria* species of fresh garden lettuce were placed inside the aquaria for snails to feed upon and the snails were observed for several weeks for emerging Cercaria at weekly intervals.

Snails were placed in 2cm transparent tissue culture trays with lids singly and were exposed to day light for about 12hours to observe if the snails are infected.

Infectivity in snails was determined by transferring the snails in groups (based on their species) to a beaker with fresh water,20 snails (200ml of water) .A strong artificial light was applied (temperature of 20-28^{0}) for two hours. The presence of cercaria was observed using a microscope with 10x40 zmagnification. If the beaker is transparent and the cercariae numerous: the cercariae may be seen when the beaker is held up against the light.

RESULTS:

Snail habitats, abundance and distribution are summarized in table I. It can be observed in table I that, *Biomphalaria pfeifferi* was the most abundant 220 (39.7), it was followed by *Bulinus globosus* 179 (32.9) and *Bulinus forskali* was the least 75 (13.5). Daskarew dam in Mubi South also recorded the highest number of snails 92 and it was followed by Sabon gari dam in Mubi North 74 and Digil pond in Mubi North recorded the least number of snails 53. In the water bodies studied, only Geruwel have been found to habour all the four snail species namely: *Biomphalaria pfeifferi, Bulinus globosus B. forskali, & Lynmae Natalensis* only 2 species *B forskali and B. Globosus* species were encountered in Sebore.

Two hundred and twenty four snails were examined for cercariae and 97(43.3) were found to be shedding cercariae (Tables II and III). Of the 224 snail vectors examined for cercaria, 32

(14.3%) were *Bulinus globosus*. While 25 (15%) were *Biophalaria pfeifferi* infected respectively (Table III). There was a significant relationship (P<0.05) between infection rate and abundance and (P<0.05) between the infection rates and distribution of *Biomphalaria pfeifferi.*

TABLE I: Snail Relative Abundance By Location And Species:

Site	*No. collected*	*B. Pfeifferi*	*B. globosus*	*B. Forskali*	*L. Natalensis*	*Total*
Biyama	70	30(42.9)	21(30.0)	10(14.3)	8(11.4)	70
Daskarew	92	36(39.1)	27(29.4)	13(13.1)	15(16.3)	92
Digil	53	22(41.5)	18(33.9)	5(9.4)	8(15.4)	52
Geruwel	68	19(27.9)	27(39.7)	12(17.7)	10(1.5)	68
Mandova	66	31(47.0)	16(2.2)	11(16.7)	8(12.1)	66
Sabongari	74	27(36.5)	22(29.7)	12(16.2)	12(17.6)	74
Sebore	64	29(45.3)	20(43.8)	7(10.90)	10(18.8)	64
Tafki	67	26(38.80)	20(29.9)	5(7.5)	16(23.9)	67
G.Total	554	220(39.7)	179(32.3)	75(13.5)	80(14.4)	554

TABLE II: Relative Abundance and Infectivity Rate of Snails In Mubi North and South L.G.A.S.

MUBI NORTH			MUBI SOUTH		
Site	*No. collected*	*No. Infect*	*Name of site*	*No. collect*	*No. Infect.*
1. Biyama Pond	70	7	Daskarew Pond	92	13
2. Digil Pond	53	6	Geruwal Pond	68	8
3. Sabon gari	74	8	Manduvah Pond	66	4
4. Tafki	67	5	Sebore Pond	64	6
Total	264	26		290	31

TABLE III: Showing Infection Rate of Snail Vector by Months in Mubi North in South Lgas of Adamawa State

	Bulinus globosus			Biophalaria pfeifferi		
Month of The year	Number Examined	Number infected	Infection rate(%)	Number examined	Number infected	infection rate(%)
April	14	7	50.00	14	5	36.00
May	14	7	50.00	14	4	79.00
June	14	6	42.90	14	0	00.00
July	14	0	00.00	14	6	64.00
August	14	4	29.00	14	0	00.00
September	14	3	21.00	14	3	43.00
October	14	02	36.00	14	3	50.00
November	14	3	21.00	14	4	29.00
Total	112	32	28.00	112	25.00	22.30

DISCUSSION:

All the genera of snail observed in this study have been incriminated for one type of Trematode disease or the other Brown (1980) and Ofienzue (1996). The *Biomphalaria pfeiffeiri* snails have been

found to be the most abundant of all the four snails species collected 220(39.7) and *Bulinus forskal* was the least encountered 75(13.5). This implies that, Mubi residents are more likely to be infected with intestinal schistosomiasis ie *schistosoma mansoni* than urinary schistosomiasis ie *schistosoma haematobium.* The fact that more snails of *Lymnea natalensis* 80 (14.4) were encountered than their *Bulinus forskali* counterparts 75 (13.5) also indicates that cattle's in Mubi metropolitan are more proned to infection by *Fasciolia gigantic* than infection by Schistosoma of cattle as also reported by Taiya et al (1980).

Infectivity is higher in *Bulinus globosus* 32 (29.0) than *Biomphalaria pfeifferi* 25 (22.3) this suggests that Urinary schistosomiasis may be more in the area than intestinal schistosomiasis. Infection rate and abundance of both *Bulinus* and *Biomphalaria* tend to fluctuate during the months under study. The highest infection rates were observed to coincide with the dry season although towards the on set of the rainy season in the months of May and June. This agrees with a similar study by Idris et al (2002), who attributed the increase in human water contact activity in all the sites studied in Mubi. Exposure was an important factor in the spread of schistosomiasis as reported by Akogun and Obadiah who opined that, there is a significant association between infection with *schistosomes* and human water contact. The decrease in infection rate of snail during the peak of this study agrees with the earlier study by Idris et al (2002).

CONCLUSION

It was observed in this study that snail vectors were widely distributed in all the study sites and in most sites, children were seen swimming freely and contaminating the ponds and streams hence this could be responsible for the high level of infection recorded in most sites in the study. The use of molluscicides in the months of May and June when the rains are about to start and infection rate of the snails in Mubi are at the peak could help in no small way in reducing the vector population in Mubi.

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