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Studies of the Population Dynamics of the Snail Vector of Schistosomiasis: The situation in the Lake Alau Reservoir.

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ABSTRACT: The construction of dams and irrigation channels usually results in the establishment of snail vectors of schistosomiasis. The near stagnant nature of the water provides suitable environment for the luxuriant growth of algae that act as a major source of food for the snail vectors. The seasonal variation of the snail *Bulinus globosus* was studied fore two years. The result showedthat the bulinidsnails were more abundant between May and September. The sampling segment C with the least volume of water recorded the highest snail abundance. The survey of school children at Armawa Primary school (close to the dam) showed an incidence of 44.5% for schistosomiasis.

Key Words: Population dynamics; Schistosomiasis; Snail vector; *Bulinus globosus.*

Introduction

The Federal Government of Nigeria has been making various efforts to boost the agricultural output of the various ecological zones in Nigeria. One of such efforts led to the construction of the Lake Alau Dam at Alau located some 20km south-east of Maiduguri, capital of Borno State.

The feasibility studies and the final engineering design were undertaken between 1983 and 1986 by the Dar-Al-Handasah consultants (unpublished contractors report from Borno State Water Board, 1993).

The Dam was constructed in 1989 under the sponsorship of the Chad Basin Development Authority (CBDA) for the purpose of irrigation and urban water supply. In fact, the original plan allocated half of the stored water to Maiduguri urban water supply and the remaining half to irrigation at the Jere Bowl area about 7km north-east of Maiduguri.

As is applicable elsewhere, the introduction of the major hydroecosystem in Alau led to changes in the socio-economic activities around the Dam. This condition is known to favour the establishment and growth of bulinid snails especially *Bulinus globosus*, that act as intermediatehost of chistosomes – the causativeagent of schistosomiasis in man and animal (Crossland, 1963, Forsyth and Macdonald, 1966). The present study therefore looks at the population dynamics of the snail vector in Alau reservoir.

Materials and Methods

The snails were sampled using sieves of 0.5mm mesh and in accordance with the Olivier and Scheiderman's sieve method (1956). Three sampling segments were chosen and sampling frequency was monthly from May, 1992 to April, 1994.

The information on the characterization and quantification of the blue green algae was obtained from the Borno State Water Board (BSWB, 1993). The urinesamples of school children aged 6 – 15 years were examined by the method of Chandler and Read (1961). The data collected were statistically analysed to predict possible associations.

Results and Discussions

The seasonal changes in snail abundance in the Alau Dam is shown in Fig. 1. On a general note, the bulinid snails were more abundant between May and September. Only few snails were observed between November and February. These changes have been linked to the ecological changes in the water body resulting mainly from external sources of pollution from fishermen and farmers in addition to seasonal variations in environmental factors such as quantity of nutrients, temperature and solar radiation. From April, these conditions manifest leading to the rapid growth of algae. During this period, the water in the dam was more or less stagnant with high temperature thereby resulting in the growth and multiplication of blue-green algae that form part of the food for the snails (Ukoliu, 1984, Ezeugwu and Mafe, 1998, Ezeugwu, 1998).

The study showed that *Volvox*, *Chlorogonium*, *Chlorella* and *Chlamydomonas* were the dominant algae species occurring almost all levels of the samples. Algae counts ranged from 1040 – 1830 cells/ml. This favours snail breeding and growth.

The low level of snails between November and February is explained by the fact that the setting in of the rains led to the high influx of water from both rain and incoming river resulting in large amount of water flowing into the dam. This led to over-flooding of the dam over its embankment thereby flushing off the algae and the floating aquatic snails.

The seasonal variation in the number of snails with egg mass also gave an indication of the distribution of the snails. As most of the snails were washed off during the over-flooding. (November – February), the few of the remaining mature snails would reproduce to start the cycle which led to a rise in snail population during April – September.

The implication of increased snail abundance is the possible increase in the incidence and transmission of schistosomiasis in the locality. Already, the survey on school children at Amarwa Primary School (close to the dam) has revealed a 44.5% incidence (Table 1). If this is allowed to continue, then over a prolonged period of about ten years, the disease incidence may likely reach 60%.

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Table 1: Prevalence of Urinary Schistosomiasis Infection Among Pupils of Armawa Primary School, Konduga L.G.A.

Age group (Yr)	Number examined			Number infected			Age group sex % Infection		Age group total % infection
	Male	Female	Total	Male	Female	Total	Male	Female	Total
6-7	4	10	14	2	2	4	50.00	20.00	28.57
8-9	14	21	35	8	10	18	57.14	47.62	51.43
10-11	7	11	18	3	4	7	42.86	36.36	38.89
12-13	10	11	21	6	4	10	60.00	36.36	47.62
14-Above	3	1	4	2	0	2	66.67	0.00	50.00
Total	38	54	92	21	20	41			
Total Sex% Infection				55.26	37.04				
Overall Total % Infection						44.57			

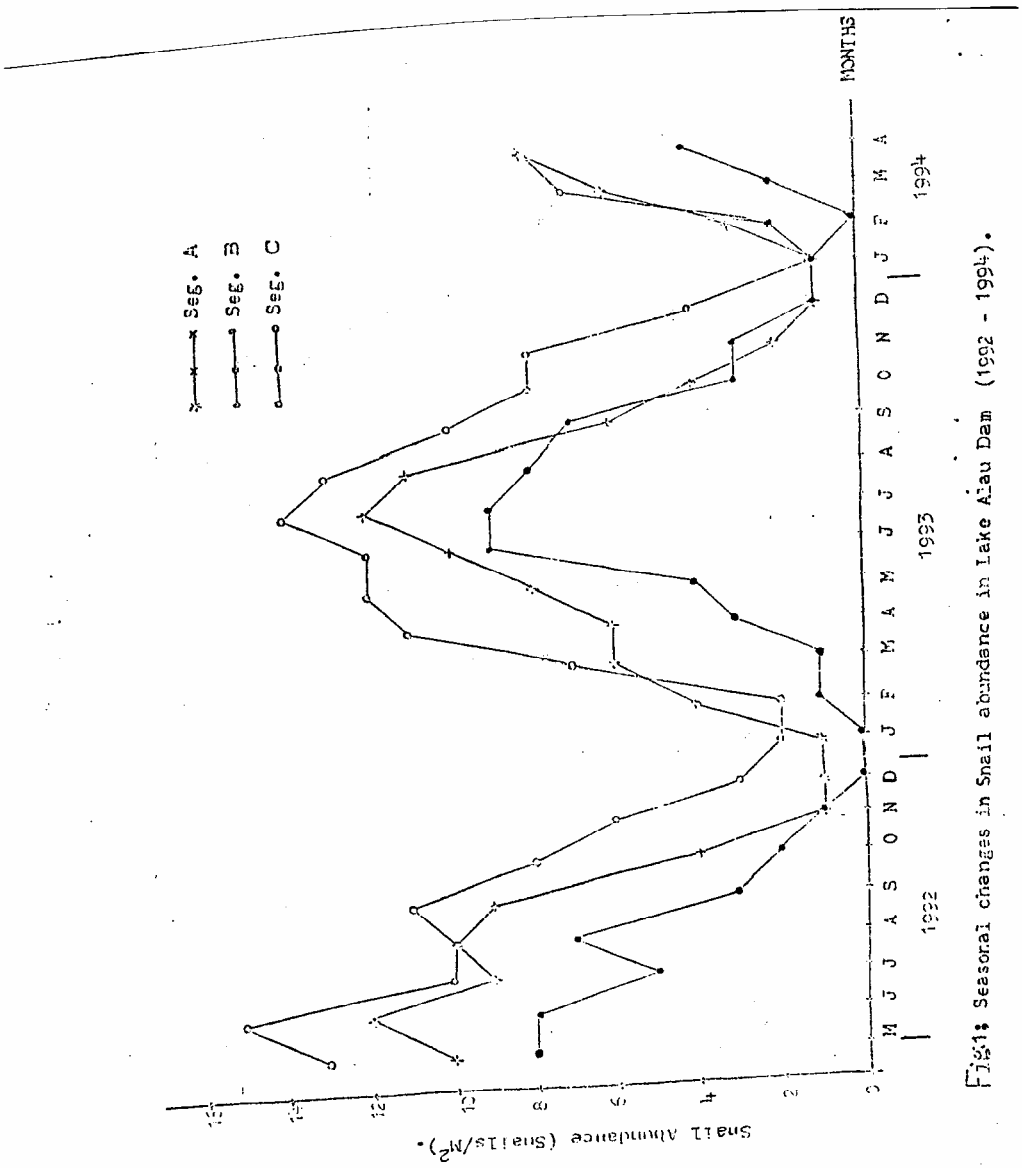

Fig 1: Seasonal changes in Snail abundance in Lake Alau Dam (1992 - 1994).

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