

Interactions of Schistosomes, Snail Hosts, Human Host, and Fish Predators in Lake Malaŵi: Year I

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INTRODUCTION

- Over the past decade we have observed a decline in population numbers of snail-eating fishes, an increase in the number of schistosome intermediate host snails (i. e., *Bulinus* sp.), and an increase in the prevalence of schistosomiasis among village residents and expatriate tourists.
- We proposed to gather comprehensive data on the transmission of schistosomiasis and factors influencing it, with the aim of determining if the above phenomena are related.
- Sampling during Year 1 was aimed at establishing baseline information regarding:
 - prevalence of disease in school-age children
 - host snail (*Bulinus globosus* and *B. nyassanus*) densities
 - relative abundance of snail eating fishes throughout the lake (3-spot molluscivores - *Trematocranus* sp.)

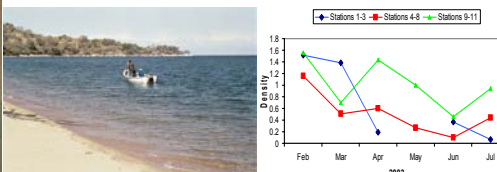
Prevalence of Infection

- Baseline data (egg counts in urine) collected on school-age children (8-19 years) in southern portion of lake (stations 1-11; please refer to the table in the southern portion of the lake). All participants were offered, and accepted, treatment.
- Restriction of fishing over 3-spot molluscivore spawning habitats will be enforced beginning in Jan 2004.
- Infection and re-infection rates will be monitored throughout the lake annually.

Host Snail Habitats & Density

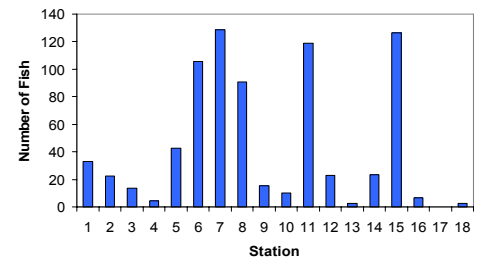


- Typical habitat of *Bulinus globosus*. One leaf has been turned over revealing the many egg masses deposited by *B. globosus* on such organic debris.



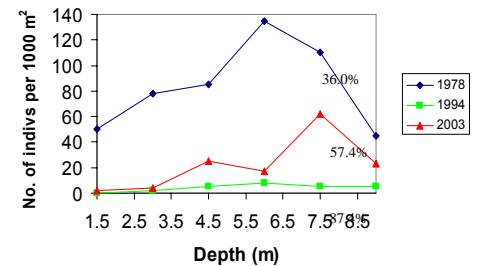
- Typical habitat and density of *Bulinus nyassanus* in 2003. Sampling takes place during the first 2 weeks of each month at stations 1-11.
- Based on previous data (Phiri 2001), we expect to see a peak in abundance in Sept/Oct.

Number of 3-spot Molluscivores



- Number of 3-spot molluscivores at stations located around the lake during January through April 2003.
- Divers swam 50 m transects at 1.5 m depth intervals from 1.5 m to 9 m deep and recorded fishes on video.

Effects of Fishing on Molluscivores



- Density of 3-spot molluscivores at the Fisheries Research (Station 6) in 1978, 1994, and 2003. Data for 1978 and 1994 from Stauffer et al. (1997).
- Density declined at all depths between 1978 and 1994. Fishing restrictions were enforced in 1998; density seems to be increasing in response to reduced fishing pressure. However, peak densities in 2003 seem to be shifted to deeper waters than in 1978.
- Prevalence of disease (indicated by percentages above) seems to increase at lower densities of fish predators.

FOCUS FOR 2003/04

- What is the infection prevalence in school-age children?
 - egg counts in urine for northern part of lake (Stations 12 to 18)
 - continue monitoring disease prevalence (re-infection rates) at stations 1-11
- Do molluscivores move into shallows to feed throughout the day/night?
 - experimental gill nets every 2 hrs. for 24 hrs.
 - diet studies of fish captured at each depth interval
- Are strains/species of snails, schistosomes, and fishes the same at all sites?
 - molecular genetics and morphology
- What are the relationships of snail-eating fishes, snail species, and human infection rates throughout the lake?
 - lake wide survey of fishes and snails in October, 2003, when *Bulinus* populations are at their peak
 - fishing over 3-spot molluscivore spawning areas will be restricted at Chembe Village (stations 4-8) in Jan 2004
 - monitoring of fishes and snails continues

LITERATURE CITED

Phiri, H.T.B. 2001. Distribution, density and infection rates of the intermediate hosts of human schistosome species in selected lakeshore communities on Nankumba Peninsula. MS thesis, University of Malaŵi.

Stauffer, J.R., Jr., M.E. Arnegard, M. Cetron, J.J. Sullivan, L.A. Chitsulo, G.F. Turner, S. Chiotha, and K.R. McKaye. 1997. Controlling vectors and hosts of parasitic diseases using fishes. A case history of schistosomiasis in Lake Malaŵi. *BioScience* 47:41-49.

ACKNOWLEDGMENTS

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Lake Malaŵi

Schools at Stations	Prevalence of Infection	n
1-3	10.61%	132
4-8	57.37 %	190
9-11	32.33 %	133

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