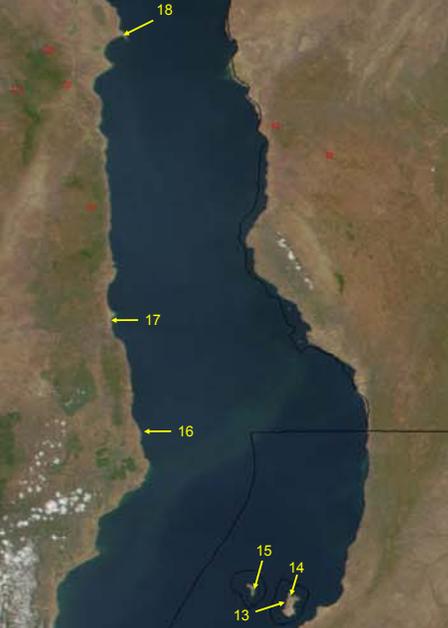


Lake Malaŵi

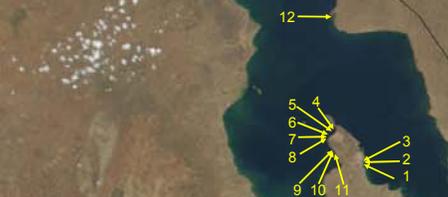
Ecological Interactions of Schistosomes, Snail Hosts, Human Host, and Fish Predators in Lake Malaŵi: Year 2

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| Schools at Stations | Prevalence of Infection | n |
|----------------------------|-------------------------|-----|
| Mpima (13) & Chilonga (14) | 27.1% | 214 |
| Kabuthu (15) | 30.1 % | 108 |



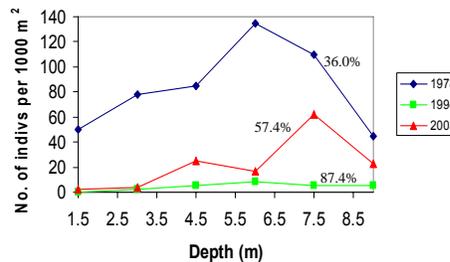
| Schools at Stations | Prevalence of Infection | n |
|---------------------|-------------------------|-----|
| Namazizi (1-3) | 10.61% | 132 |
| Chembe (4-8) | 57.37 % | 190 |
| Msaka (9-11) | 32.33 % | 133 |



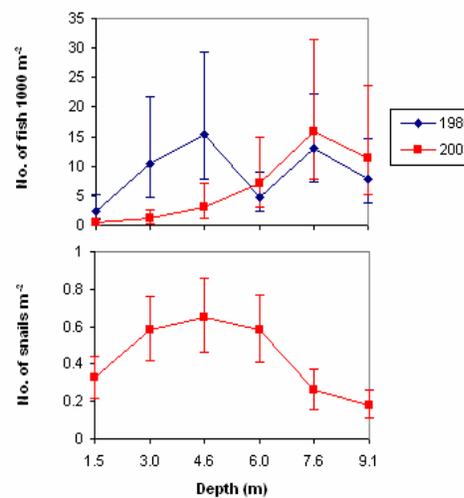
Introduction

- 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 to determine if the above phenomena are related.
- Sampling during Year 2 was aimed at determining the relationship between:
 - 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.)

Effects of Fishing on Molluscivores

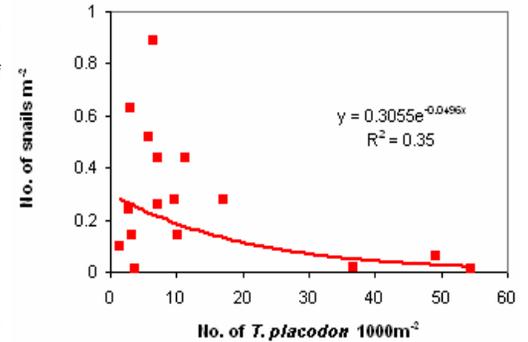


- Density of 3-spot molluscivores at the Fisheries Research (Station 6) declined at all depths between 1978 and 1994 (Stauffer et al. 1997). Fishing restrictions were enforced in 1998; density seems to be increasing in response to reduced fishing pressure particularly in deeper waters.
- Prevalence of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



- Density of *Trematocranus placodon* (1980 and 2003) and *Bulinus nyassanus* (2003) by depth at stations 4-8 at Chembe Village.
- Densities of *T. placodon* at all stations at Chembe Village (4-8) in 2003, were comparable to 1980 densities in deeper waters, but were still lower at depths below 5m.
- Peak abundance of *B. nyassanus* in 2003 is in shallow water (<7m), where *T. placodon* densities are low.

Relationship between Snails and Fish



- Density estimates of both snails and fishes at localities from where we had prevalence data (i.e., Nankumba Peninsula, Likoma Island, Chisumulu Island) exhibited a negative relationship between density of *B. nyassanus* and *T. placodon*.
- We will be refining data collection in areas that exhibit low densities of *B. nyassanus* and *T. placodon* to test the hypothesis that these may be areas of poor snail habitat.

Prevalence of Infection

- Two possibilities for disease transmission within the lake itself exist: either by cercariae produced within the lake or by cercariae transported into the lake by inflowing streams or rivers.
- The infection rate among school children of Chembe Village (stations 4-8) was 36% in 1978. In 2003 infection level was 57.4% (please refer to the table in the southern portion of the lake). This increase in infection level between 1978 and 1994 is coincident with the reduction in numbers of snail-eating fishes and the discovery that *B. nyassanus* is an intermediate host of human schistosomes. Introduced strain of schistosome?

- In Chisumulu (stations 13 & 14) and Likoma (station 15) islands, where we found no infected *B. nyassanus*, infection level ranged between 27.1-30.1% (please refer to table in northern portion of lake). *B. globosus* were present in inshore areas and in areas with dense vegetation.

Focus for 2004/2005

- Are there different species of 3-spot molluscivores that are endemic to different parts of the lake?
- Does the same species of 3-spot molluscivore have the same life history pattern throughout the lake?
- Are the intermediate hosts (snails) different in different parts of the Lake and do they have different susceptibilities to schistosomes?
- Are different strains of schistosome found in different parts of the lake?

LITERATURE CITED

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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