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Controlling vectors and hosts of Schistosomes in Lake Malawi

Schistosomiasis is a parasitic disease of major public health importance in many countries in Africa, Asia, and South America. The disease is caused by trematodes of the genus *Schistosoma* that require specific freshwater snail species to complete their life cycles. Prior to 1985, the open waters of Lake Malawi were free from schistosome transmission. Over the past decades, however, the prevalence of urinary schistosomiasis has increased dramatically in the southern part of the lake. We found the prevalence of human schistosomiasis in school-aged children to be negatively correlated with the density of molluscivorous fishes. Specifically, the increase in infection rate in southern Lake Malawi between 1978 and 1991 is coincident with the reduction in numbers of snail-eating fishes. During 2003, we determined the relative abundance of molluscivorous fishes and snail density at 18 sites throughout the lake, and schistosome infection in school-aged children living in selected lake shore communities of Lake Malawi. At the 18 sites sampled in 2003, we found that snail abundance decreased with an increase in abundance of snail-eating fishes. Furthermore, the 2003 samples showed that the abundance of snail-eating fishes increased and there was a reduction in schistosomiasis in school-aged children in Chembe Village. We believe that we will not observe a return to the 1978 infection rates until these fishes continue to increase and inhabit shallower waters. The transmission of the disease may be further complicated.

We postulated that a strain of *S. haematobium* from other parts of Africa, which was introduced into the Cape Maclear region of Lake Malawi by tourists, was compatible with *Bulinus nyassanus*—which is a close relative of *B. truncatus*, and interbred with the indigenous strain of *S. haematobium*, which ultimately produced via introgression a strain that can use both *B. globosus* and *B. nyassanus* as intermediate hosts. This actively evolving situation involving intermediate snail–host switching and decline of *Trematocranus placodon*, a natural cichlid snail predator, will impact on transmission of urogenital schistosomiasis within the local communities and on tourists who visit Lake Malawi.

Speaker Biography

Jay R Stauffer is a Distinguished Professor of Ichthyology at Penn State University. His international work has involved the transfer of research results and technology to both the local governments and the people of Malawi. The Smithsonian (1988:144-155) highlighted his early work on Lake Malawi and the British Broadcasting Corporation (BBC) used him as a primary consultant on fishes and used his underwater videos in several of their productions, including *Blue Planet*. In 2006, he co-authored an educational brochure entitled *Bilharzia in Lake Malawi – What are the Facts*, that was published in both English and Chechewa, the most widely used language in Malawi (<http://sfr.psu.edu/research/labs/stauffer/lake-malawi/general/bilharzia/view>). His international studies also gave him the opportunity to describe several species of fishes from Malawi and Nicaragua, and to study the adverse impact of the introduction of African tilapia on native species.

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