

# Gen natural populations of human and rodent schistosomes in the Lake Victoria region of Kenya: a molecular epidemiological approach.

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## Abstract

### BACKGROUND:

*Schistosoma mansoni* exists in a complex environmental milieu that may select for significant evolutionary changes in this species. In Kenya, the sympatric distribution of *S. mansoni* with *S. rodhaini* potentially influences the epidemiology, ecology, and evolutionary biology of both species, because they infect the same species of snail and mammalian hosts and are capable of hybridization.

### METHODOLOGY/PRINCIPAL FINDINGS:

Over a 2-year period, using a molecular epidemiological approach, we examined spatial and temporal distributions, and the overlap of these schistosomes within snails, in natural settings in Kenya. Both species had spatially and temporally patchy distributions, although *S. mansoni* was eight times more common than *S. rodhaini*. Both species were overdispersed within snails, and most snails (85.2% for *S. mansoni* and 91.7% for *S. rodhaini*) only harbored one schistosome genotype. Over time, half of snails infected with multiple genotypes showed a replacement pattern in which an initially dominant genotype was less represented in later replicates. The other half showed a consistent pattern over time; however, the ratio of each genotype was skewed. Profiles of circadian emergence of cercariae revealed that *S. rodhaini* emerges throughout the 24-hour cycle, with peak emergence before sunrise and sometimes immediately after sunset, which differs from previous reports of a single nocturnal peak immediately after sunset. Peak emergence for *S. mansoni* cercariae occurred as light became most intense and overlapped temporally with *S. rodhaini*. Comparison of schistosome communities within snails against a null model indicated that the community was structured and that coinfections were more common than expected by chance. In mixed infections, cercarial emergence over 24 hours remained similar to single species infections, again with *S. rodhaini* and *S. mansoni* cercarial emergence profiles overlapping substantially.

**CONCLUSIONS/SIGNIFICANCE:** The data from this study indicate a lack of obvious spatial or temporal isolating mechanisms to prevent hybridization, raising the intriguing question of how the two species retain their separate identities.