Applying GIS and Remote Sensing to the Epidemiology of Schistosomiasis in Poyang Lake, Jiangxi Province, China

George M. Davis[1], Wei-Ping Wu[2], Hong-Yun Liu[3], Gail Williams[4], Shang-Biao Lu[3], Hong-Gen Chen[3], Edmund Seto[5]

[1]Department of Microbiology and Tropical Medicine, George Washington University Medical Center, Washington, D.C., 20037, U.S.A
[2]Tropical Medical Research Center, Institute of Parasitic Diseases, Chinese Center for Disease Control, Shanghai, 200025, P.R. China.
[3]Jiangxi Provincial Institute of Parasitic Diseases, Nanchang, P. R. China
[4]Australian Centre for International and Tropical Health and Nutrition, The University of Queensland, Brisbane, Queensland 4029, Australia
[5]School of Public Health, University of California, Berkeley, California 94720, U.S.A

Abstract

Remote sensing, using Landsat TM imagery, has been used to classify snail habitat in the Poyang Lake marshlands, a vast area of high endemism for schistosomiasis in China (Jiangxi Province). Major findings of the study were: 1. RS images are useful for delineating snail habitat and differentiating snail habitat from total bovine grazing ranges. 2. RS enabled tracking yearly dynamic changes in lake area and snail habitat. 3. Dynamic environmental factors are responsible for the fact that some areas suitable for snails may not have snails one year, but have snails another year. 4. The critical factor for maintaining stable population structure is relative temporal stability in mean low water levels. 5. The TMRC snail survey method, employed twice a year, enables a robust statistical evaluation (especially analysis of variance) of changes in snail population density and patterns of infection over large areas. This snail collecting method involving repetitive random sampling and 4 m^2 frames has resulted in reducing the adverse effects of the severe negative binomial distribution of the snails in the sampling data sets, thus enabling statistical analyses.