

Mathematical modeling of biological systems (E-SEASON Session 1)

A model of Schistosomiasis accounting for water speed and level

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Schistosomiasis mekongi is prevalent in the Mekong river basin. The disease is mainly detected from the Khong district in southern Laos to Kratie province in northern Cambodia. The total population at risk is estimated as 60,000 in Laos and 80,000 in Cambodia. Most models for schistosomiasis are made of ordinary differential equations describing the transmission through an intermediate host (snails) to the final hosts (humans or mammals). Here we will present a new Ross-type model that takes into account the water level and its speed. The model is now a coupled ODE-PDE system which is well-posed (proof relies on a built symmetrized system). Finally, results will be illustrated with some numerical simulations showing that great speed and deep water avoids the spread of the epidemics, which might explain why the disease remains confined to the southern part of Laos.

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