Abstract:

Anopheles mosquito is a vector responsible for the transmission of diseases like Malaria which affect many people. Hence its control is a major prevention strategy. The Sterile Insect Technology (SIT) has been known for relatively long time but not yet used for mosquito control. With the demand for nonpolluting control methods SIT is receiving an increased attention. In this paper we design a mathematical model for the effect of SIT as a control measure on the Anopheles mosquito population. The aim is to design efficient strategies leading to reduction of the mosquito population below certain epidemiologically relevant threshold. The mathematical analysis of the model deals mainly with its properties as a dynamical system. Naturally, these include the equilibria and their stability. We also place an essential emphasis on establishing properties of global nature like dissipativity of the system, global asymptotic stability of an equilibrium when it is unique and the basins of attraction of stable equilibria if they are more. This analysis is based on an application of the theory of monotone dynamical systems.