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Abstract

The effects of seasonal variations on the epidemiology of *Trypanosoma brucei rhodesiense* disease is well documented. In particular, seasonal variations alter vector development rates and behaviour, thereby influencing the transmission dynamics of the disease. In this paper, a mathematical model for *Trypanosoma brucei rhodesiense* disease that incorporates seasonal effects is presented. Owing to the importance of understanding the effective ways of managing the spread of the disease, the impact of time dependent intervention strategies has been investigated. Two controls representing human awareness campaigns and insecticides use have been incorporated into the model. The main goal of introducing these controls is to minimize the number of infected host population at low implementation costs. Although insecticides usage is associated with adverse effects to the environment, in this study we have observed that by totally neglecting insecticide use, effective disease management may present a formidable challenge. However, if human awareness is combined with low insecticide usage then the disease can be effectively managed.

Keywords: *Trypanosoma brucei rhodesiense*; seasonality; stability; optimal control