

Sterile Insect Technology for Control of *Anopheles* Mosquito: A Mathematical Feasibility Study

Roumen Anguelov¹, Yves Dumont² and Jean Lubuma¹

¹University of Pretoria, South Africa

{roumen.anguelov,jean.lubuma}@up.ac.za

²CIRAD, Umr AMAP, Montpellier, France

yves.dumont@cirad.fr

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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. Sterile Insect Technology (SIT) is a nonpolluting method of insect control that relies on the release of sterile males. Mating of the released sterile males with wild females leads to non hatching eggs. Thus, if sterile males are released in sufficient numbers or over a sufficient period of time, it can lead to the local reduction or elimination of the wild population. We study the effectiveness of the application of SIT for control of *Anopheles* mosquito via mathematical modeling. Our main result is that there exists a threshold release rate $\hat{\lambda}$ depending only on the basic offspring number R and the wild mosquito equilibrium for males such that a release rate higher than $\hat{\lambda}$ results in elimination of the mosquito population irrespective of its initial size. A release rate λ which is lower than $\hat{\lambda}$ eliminates the mosquito populations only if it is sufficiently small. If the population is at the wild equilibrium it is reduced by a percentage depending on λ and R only.