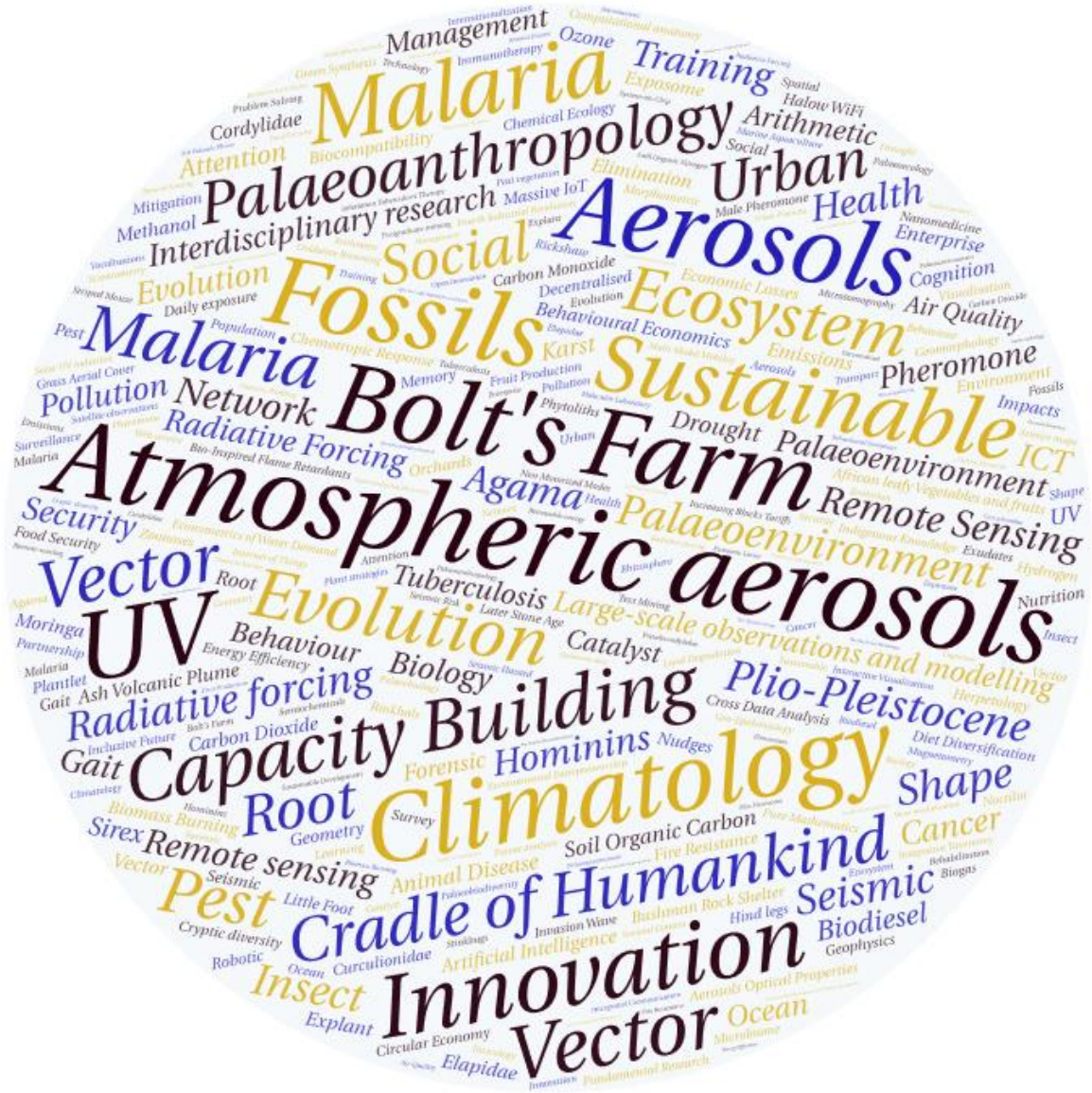
French South African Science and Innovation Days

2 - 3 December 2019
CSIR International Convention Centre, Pretoria

Posters Abstracts



The Sterile Insect Technique. On the usefulness of Mathematical Modelling

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In the last decades, the development of sustainable insect control methods, like sterile insect technique (SIT), has become one of the most challenging issue to reduce the risk of human vector-borne diseases, like malaria, dengue, chikungunya or crop pests, like fruit flies. SIT control generally consists of massive releases of sterile insects in the targeted area with the aim to reach elimination or to lower the pest population under a certain threshold. Practically, due to e.g. manufacturing limitations/constraints and the (economic) cost of such operations, massive releases of sterile males are only possible for a short period of time. Despite that restriction, the main issue is to quantify the size and the duration of massive releases, before, eventually, shift to a low level and more sustainable releases of sterile insects, in order to reach elimination or maintain wild insects below an epidemiological risk threshold.

Mathematical modelling can be a powerful tool to provide insights in the long-term dynamics of complex systems, like wild insects population experiencing SIT control. In this poster, we present minimalistic entomo-mathematical models for wild insect population when SIT is taken into account. Using Mathematical analysis and simulations, we show that different strategies can be developed, like, for instance a strategy that maintains the wild population under a certain threshold, for a permanent and sustainable low level of SIT control and ensuing their elimination in the long-term dynamics. Taking into account the spatial component in the previous strategy, we also show that it can be used to stop a pest/vector invasion and eventually push them back.

This work is partly supported by the "SIT feasibility project against *Aedes albopictus* in Reunion Island" phase 2B, jointly funded by the French Ministry of Health and the European Regional Development Fund (ERDF). The authors were supported by the DST/NRF SARChI Chair M2B3, in Mathematical Models and Methods in Biosciences and Bioengineering, at the University of Pretoria (grant 82770).

Keywords: Sterile Insect Technique, Vector, Pest, Monotone system, Invasion wave