Stage-Structured Model for *Aedes Aegypti* and *Wolbachia* Interaction

HELIO SCHECHTMAN [*1], Daniel Villela[1], and Max O Souza[2]

[1] *Programa de Computação Científica, Fundação Oswaldo Cruz, Rio de Janeiro, Brazil*
[2] *Departamento de Matemática Aplicada, Universidade Federal Fluminense, Niterói, RJ, Brazil*

We describe the population dynamics of *Aedes aegypti*, the main vector for Dengue, using a density-dependent model comprising five stages, *i.e.* eggs, larvae, pupae, non-parous, and parous winged mosquitos. *Wolbachia*-transinfected mosquitoes, which might be impervious to the Dengue virus, were considered to be less fit, *i.e.* produced less off-springs and were more prone to death.

Interaction between *Wolbachia*-infected and non-infected mosquitoes was considered to comprise full cytoplasmic incompatibility and vertical transmission of the bacteria. Oviposition was modelled as a result of random non-preferential mating, under a 1:1 sex ratio, in large homogeneous populations.

The model ODE's and its computational implementation are flexible enough to allow testing of various strategies for introducing *Wolbachia*-transinfected mosquitoes, such as releases of eggs or parous adults.

Results predict invasion by *Wolbachia*-infected mosquitoes for single and 52 consecutive weekly releases. Albeit, with largely different numbers of released individuals and time delays.

[*] helio.schechtman@gmail.com