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AEDES AEGYPTI AND *WOLBACHIA* INTERACTION

Claudia Pio Ferreira

São Paulo State University (UNESP),
Institute of Biosciences, Department of Biostatistics,
18618-689 Botucatu, SP, Brazil

claudia.pio@unesp.br

Laboratory and field tests have been highlight the importance of choosing an optimal *Wolbachia* strain to ensure the success of colonization and persistence of the released *Aedes aegypti* infected mosquito. Thresholds for vertical infection transmission and male sterilization depend on bacterial density and its distribution in mosquitoes tissue, which also affects strongly mosquito fitness. Temperature variation during mosquito development phase is an important factor that can affect the feasibility of this novel technique to control dengue transmission. In this context, a mathematical model is proposed to assess the factibility of dengue control transmission using a transinfection of *Aedes aegypti* with a *Wolbachia* strain. This model takes the form of a delay-differential system with two delays. The strength of this approach is measured by the fact that it can address several aspects of the problem, through scenarios construction where model parameters are setting according to mosquito genetic background, its ability to transmit the bacteria to the next generation, and its competence to block virus replication. The persistence of both infected and wild population is explored in the context of mosquito's fitness, host-symbiont interaction, and temperature change. Surprisingly, the model predicts that mosquito population extinction can occur in a region of the parameter space where the reproductive number of the wild population is bigger than one and migration of mosquitoes from surrounding areas is not allowed.

References

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