Mosquito population control strategies for the fight against arboviruses

Nicolas Vauchelet [1], Luis Almeida[2], Michel Duprez[2], Yannick Privat[3], Martin Strugarek[2]

[1] Université Paris 13

[2] Sorbonne Université

[3] Université de Strasbourg

In the fight against arboviruses, new strategies consist in acting directly on the population of mosquitoes, which are the main vector for diseases like dengue, chikungunya, zika. Among these strategies, we may consider the Wolbachia strategy and the sterile insect technique. These two strategies consist in releasing mosquitoes in the field in order to, either replace the wild population by a population unable to transmit arboviruses for the Wolbachia strategy, or diminish the size of the population of mosquitoes for the sterile insect technique. In this presentation we will consider the mathematical modelling of theses strategies and focus on the question of optimization of the releases in the aim to be as close as possible of the desired state at the end of the period of treatment.

References

[1] L. Almeida, M. Duprez, Y. Privat, N. Vauchelet, *Control strategies on mosquitos population for the fight against arboviruses*, submitted.

[2] L. Almeida, Y. Privat, M. Strugarek, N. Vauchelet, *Optimal releases for population replacement strategies, application to Wolbachia*, submitted.

[3] M. Strugarek, N. Vauchelet, *Reduction to a single closed equation for 2 by 2 reaction-diffusion systems of Lotka-Volterra type*, SIAM J. Appl. Math. 76 (2016) no 5, 2068-2080.