

La technique des insectes stériles utilisée comme barrière contre réinfestation

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Due to the number of diseases that they transmit, mosquito is considered as one of the most dangerous animal species for humans. The Sterile Insect Technique (SIT) is a classic vector control method that has been successfully applied to control diverse insect plagues since the 1950s. In recent years, several countries have utilized the SIT to control mosquito populations, in order to limit the spread of the diseases they transmit. The classical SIT consists in the release of a large number of males sterilized by ionizing radiation, which results in a progressive reduction of the total population.

Based on the ODE model in [?] , we present a PDE model that represents the release of sterile mosquito males in a limited area inside a wider area containing a natural mosquito population. We are interested in controlling the population inside the release region, and blocking the reinvasion of mosquitoes from the exterior. We adapt the geometric method in [?] and extend their main result, to find relations on the size of the release region and the density of the released sterile males that allow us to fulfill this. We perform numerical simulations for the spatial models to observe the presence of wave-blocking for a large enough release of sterile males. We also simulate several mosquito release strategies for the ODE model.