

Modeling the use of Insect Sterilization in Controlling Yellow Fever · *Elisabet Olsen, Maggie Myers, and Erin N. Bodine*

Yellow fever is a viral hemorrhagic disease transmitted by infectious female *Aedes aegypti* mosquitoes, and has caused thousands of deaths throughout Africa, the Americas, Europe, and the Carribean. Although there are several control measures to reduce the virus, there is still no known cure for it. In 1878, the largest yellow fever epidemic occurred in Memphis, which resulted in over 5,000 deaths. We developed a mathematical model consisting of twelve ordinary differential equations that represents the dynamics of the human and mosquito populations during the epidemic. Our model investigates the effects of the implementation of a sterile insect technique (SIT). Specifically we analyze artificially infecting the mosquitoes with *Wolbachia*, a maternally-transmitted endosymbiotic bacteria that interferes with the reproductive success of insects by causing cytoplasmic incompatibility. We hope to reduce the mosquito population, and also establish the bacterium within the *Aedes aegypti* population.