

Making males: from medfly biology to medfly control

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Ceratitis capitata, commonly known as the medfly, is a Tephritid pest known best for its global distribution, vast economic impact and flexible host selection. The current golden standard for Tephritid population control is the sterile insect technique (SIT), which relies on mass release of males sterilized using radiation. Its biggest caveats are the reduced fitness of released males and the high rearing due to the need for sex sorting at adulthood. These limit the efficiency of SIT-mediated population suppression, as well as the frequency of its implementation globally. Genetic control offers a species-specific approach to tackle this problem by delivering novel traits into target populations via the release of modified insects. We developed a highly efficient CRISPR/Cas9 toolkit for use in the medfly to establish a fully-fledged precision-guided sterile insect technique (pgSIT). PgSIT, which utilizes CRISPR/Cas9 technology to simultaneously target genes vital for female development and male fertility generating a sterile male-only progeny, was recently developed as a replacement for the traditional, cost-ineffective SIT. To date, pgSIT has already been successful in *Drosophila* and *Aedes aegypti*, and in this project we showcase the feasibility of this approach in the medfly. Establishing a sex conversion-based pgSIT system in *C. capitata*, as proof of principle, will act as a steppingstone to control other Tephritid pests through the implementation of the same technology.