

## **The following are questions that were directed toward FKMCD around the proposed GM Mosquito trial and the 1<sup>st</sup> Generation (OX513A) Mosquito.**

*What pesticides, in what quantities, are currently being used to treat Aedes aegypti mosquitoes?*

In 2014, the following abatement materials and amounts were used to combat Aedes aegypti throughout the Keys:

- Methoprene: 113 lbs./22.8 acres
- Temephos: 89 lbs./8.9 acres
- Sumethrin/Prallethrin: 1 gal./388 acres
- Spinosad: 17,790 tablets/41 acres
- Bti: 7,425 lbs./52,000 acres

*What insecticides do you anticipate being able to reduce or eliminate because of this program?*

The vast majority of the insecticides listed above are used to combat Aedes aegypti in Key West. Thus, assuming that FKMCD achieves 90% or higher reduction in Aedes aegypti as found so far in Brazil and Panama, nearly all of the insecticides use in Key West would be reduced. FKMCD would still continue to treat water holding containers in yards with small amounts of larvicide (i.e. Bti). Occasional use of an adulticide would be needed if there was a surge in saltmarsh mosquitoes (this is rare nowadays due to our aggressive larviciding program)

*Which of these – and by what percentages – will presumably be reduced by introducing GM mosquitoes?*

Assuming that FKMCD achieved 90% or higher reduction, there would be a 100% reduction in Vectobac WDG (a larvicide with active ingredient Bacillus thuringiensis israelensis (Bti)) and an 80% reduction in Duet (a dual-action adulticide with active ingredients Sumethrin and Prallethrin).

*What effects could Oxitec mosquitoes have on the ecosystems?*

It's very unlikely that Oxitec's technology would have any major effects on the ecosystem of an area in which they were released.

Outside of Africa, *Aedes aegypti* is an invasive species that has been spreading around the world in the last few hundred years, so reduction of this introduced pest would help restore the ecosystem. When a species has been recently introduced to a country, it is unlikely that any native species is substantially dependent on them, e.g. for food, especially where the species is an urban dweller living exclusively close to people. *Aedes aegypti* mosquitoes do not make up a significant proportion of the diet of their various predators. Therefore, although various other animals (fish, ants, spiders, etc.) can eat them if they find them, they do not depend on this one species as their primary food source.

Oxitec's approach exclusively targets the *Aedes aegypti* mosquito. However other control tools such as insecticides are broad spectrum and will affect many insect species and potentially their food chains.

*Will the use of GE mosquitoes result in a reduction of spraying and/or changes to other mosquito control methods?*

Yes. Traditionally, the only successful control technique for *Aedes aegypti* has been chemical use. DDT was first used around 1950 and resulted in complete eradication of this species from 16 countries. Since then, there have been 100's of attempts at control. The vast majority were unsuccessful. There has been some short-term success with “dumping and draining” combined with chemical use, but these successes have been very short-term ... a few years at best.

FKMCD expects that chemical use would be reduced as the *Ae. aegypti* population declined. If FKMCD had reductions of 80% or more, FKMCD would rarely need to spray for *Ae. aegypti*. On the rare occasion, such as a surge in *Ae. Aegypti*, we would spray in isolated areas until GM releases in that area pushed the population back down.

*Is this technology effective? Has FKMCD considered, other control methods, like the Wolbachia bacteria technique that effectively immunized the Aedes aegypti mosquitoes from Dengue?*

Yes. Recent publications show the effectiveness of Oxitec's technique continued over a 3-year monitoring program where the bacteria was passed from generation to generation:

- [Nature](#)
- [PLOS](#)

Many other control methods have been considered and even tested in the Keys to combat *Aedes aegypti*. These include, aerial larviciding with BTI, lethal ovicups, sticky ovicups, and *Wolbachia*. Currently, *Wolbachia* in *Aedes aegypti* is still in the testing phase in the United States.

*Have Oxitec's insects been independently evaluated?*

Yes. Independent collaborators around the world have conducted extensive testing on Oxitec's insects, including:

- The Institute Pasteur, France
- The Gorgas Memorial Institute, Panama
- The Institute for Medical Research, Malaysia
- The Department of Agriculture and Food, Western Australia (DAFWA)
- The University of Crete, Greece
- SAOAS, Morocco
- Gangabishan Bhikunal Investment and Trading Limited (GBIT), India
- The University of Colorado
- Cornell University, New York
- The United States University of Health Sciences (USUHS)
- The Center for Medical and Veterinary Entomology (CMAVE), Florida
- The Mosquito Research and Control Unit (MRCU), Cayman Islands
- University of São Paulo, Brazil

*Does the FKMCD have a plan in place to monitor the movement of these mosquitoes?*

We have a robust surveillance program for *Ae. aegypti* and we've been extensively monitoring

the population since 2010 with various methods that survey for eggs, larvae, and adults. What is useful and unique about the Oxitec GM mosquitoes is that they have a fluorescent gene that allows us to monitor their movement throughout the Keys.

*How much will this experiment cost?*

Oxitec is covering the vast majority of the experimental costs. FKMCD has dedicated very little financially thus far (approx. less than \$10,000 in direct expenses). However, FKMCD is planning to dedicate approximately 2.5 – 3 Field Inspectors to the experiment for the 6-12 months that we expect the trial to last. That is worth approximately \$100,000 - \$200,000 in time and overhead. Of course, there has also been considerable administrative time to work with education and outreach, renovations, and safety/QA over the years. FKMCD explores many new techniques for mosquito control and dedicates time and money commensurate with expected gain/success of the various experiments

*How much would it cost if the FKMCD moves forward with this technology and has to release thousands or millions of genetically modified mosquitoes on a regular basis?*

FKMCD has been very clear that this technique must cost no more than our current chemical-intensive methods. It must also be more effective than our current methods.

Currently, FKMCD spends approximately 1.1 Million dollars a year to combat *Ae. aegypti* in the Key West area to achieve an estimated 50% reduction of the “normal” *Ae. aegypti* population.

*How does the FKMCD justify the cost of this mosquito program to prevent dengue fever when there haven't been any cases of the illness since 2009?*

The proposed Oxitec GM Mosquito Project is a trial – FKMCD has not established this as part of the mosquito control program at this time. FKMCD will be assisting with this trial if it receives approval from the regulatory agency. FKMCD is reviewing this technology as another potential tool to combat mosquitoes. If the trial is approved, FKMCD will review the results of the trial in terms of effectiveness and cost and will then determine if it is a viable addition to our control program.

*How will the FKMCD notify the community about when and where the trial release will happen?*

FKMCD will notify the community through all the media outlets in the Keys in the form of press releases and interviews, announcements and updates on our social media pages and our website.

*Who will be legally and financially liable if something goes wrong?*

Oxitec, Ltd. would be legally and financially responsible.

*If I own my land and do not give permission to have GM mosquitoes released on my property - how do you have the right to use my property?*

The GM mosquitoes, if approved, will be released on public land not private property. Just as current mosquito control abatement products can drift, male GM mosquitoes in search of female wild mosquitoes may come onto private property.