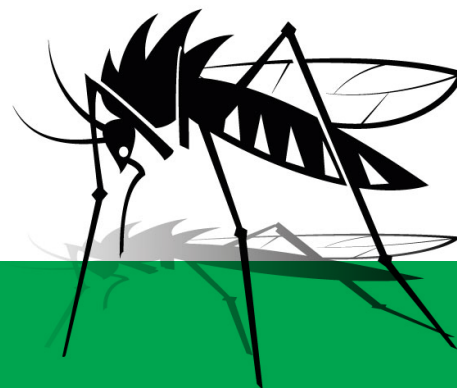




OXITEC



MOSQUITO RESEARCH
& CONTROL UNIT
CAYMAN ISLANDS GOVERNMENT



FACTS ABOUT THE “FRIENDLY *Aedes aegypti* PROJECT”

An effective tool to fight the mosquito that transmits Zika, Chikungunya and Dengue.

In the interest of public health, the Mosquito Control and Research Unit (MRCU) is launching new controls to combat the dangerous *Aedes aegypti* mosquito.

This invasive species of mosquito, which is not native to the Cayman Islands, carries life-threatening viruses including Zika, chikungunya and dengue.

There is currently no cure or vaccination against these viruses, which are prevalent in the region.

MRCU is launching the new controls in collaboration with biotechnology company Oxitec, which uses genetically modified mosquitoes to target and control the *Aedes aegypti*.

The GM controls will be used in an integrated programme with existing methods, which are not fully effective.

Responses to common questions

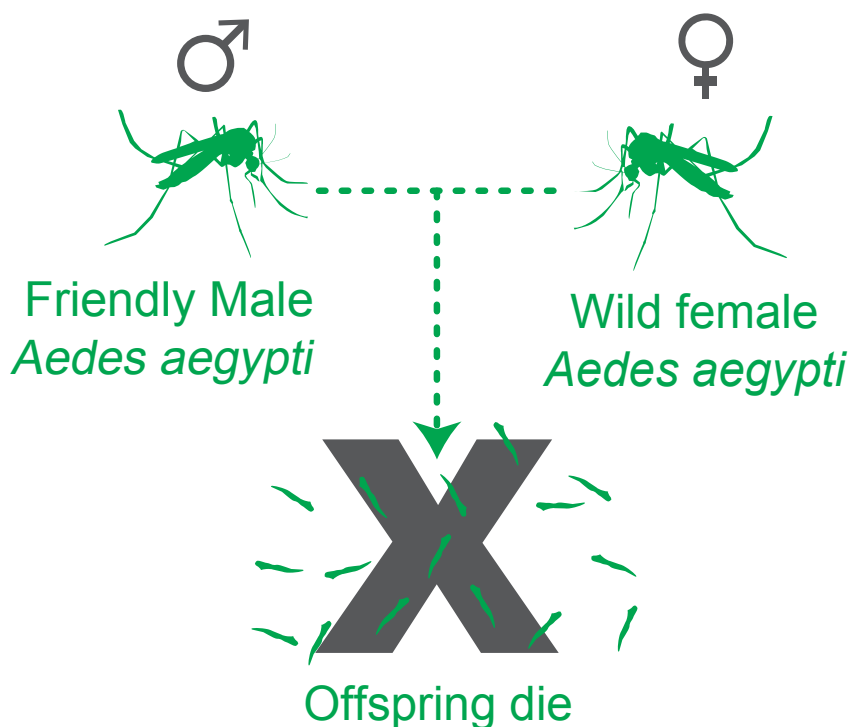
Q. Why is this project being done?

QA **What is the need/benefit?**

A. The aim of the project is to better control *Aedes aegypti* in an area of West Bay in Grand Cayman. This mosquito is able to transmit Zika, dengue, chikungunya, yellow fever and potentially additional viral diseases, so an improved method of control is in the public health interest as existing methods are not effective enough.

QA **Q. How does the technology work?**

A. The friendly *Aedes aegypti* is a genetically modified male mosquito that cannot bite or transmit diseases. When it mates with a local female *Aedes aegypti* mosquito, the offspring die before being able to reproduce. Hence with successive releases, the population of the Zika, chikungunya and dengue mosquito is reduced.



QA **Q. How long will the project last?**

A. The first phase has 9 months of releases after a period of community engagement.

QA **Q. Why was West Bay chosen for the project?**

A. It is a 'hot spot' for *Aedes aegypti*, and there have been cases of chikungunya and dengue there previously. The project may subsequently be expanded to other areas, subject to regulatory approval.

QA **Q. Has there been a proper approval process in Cayman?**

A. Yes. The project was first approved by the Department of Agriculture and the Department of Environment. Following the implementation of the National Conservation Law, the project was also approved by the National Conservation Council, concluding that there would be no impact on the environment or the population.

QA **Q. Was the public consulted?**

A. The choice of mosquito suppression tool is a matter for government and has been made in the public health interest, based on the most appropriate interventions available. The regulatory process is transparent and included public sessions. We are actively engaging in education of the public.

QA **Q. Is this a tested technology?**

A. Yes. The project in Cayman comes after several successful trials of the technology in East End in 2009 and 2010, and elsewhere, achieving more than 90% reduction in local *Aedes aegypti* populations. Furthermore it is consistent with the World Health Organization's recent recommendation for operational use of Oxitec's mosquitoes in response to the international emergency related to Zika virus, as well as the other diseases carried by the *Aedes aegypti*.

ZIKA VIRUS



SPREAD

The virus spreads through mosquito bites



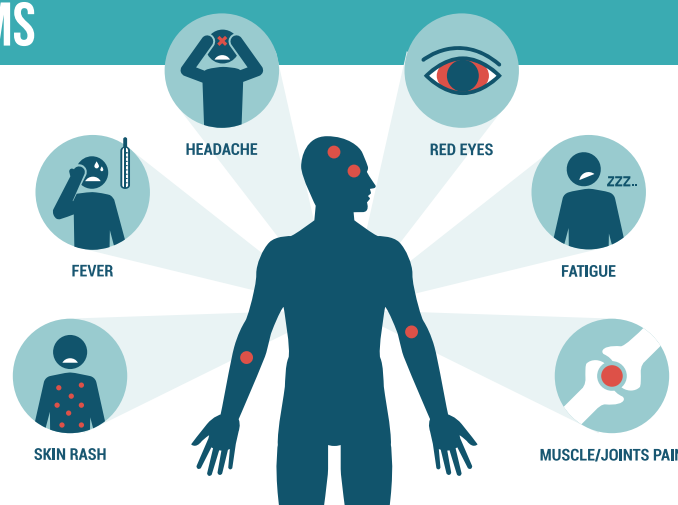
About 1 in 5 people infected gets sick.

The virus can be transmitted through blood and sexual intercourse.



The virus can be transmitted from a pregnant woman to her baby and could lead to microcephaly.

SYMPTOMS



This section addresses points from an advert published in the Cayman Compass on Friday, June 3 2016.

Responses to points raised by the advert

The ad says: "Oxitec obtained approval from FDA in South Florida. Why has the FDA now rescinded that approval and stopped the release pending further assessment and a country-wide vote?"

In fact: The FDA published in March 2016 a preliminary Finding of No Significant Impact, which concluded that the planned Florida trial would not have a negative impact on human health or the environment. The public consultation phase on this preliminary finding has recently finished and the final position of US FDA will be issued in due course. Nothing has been rescinded; the FDA does not put their decisions to a vote. The Florida Keys Mosquito Control District has decided to conduct a non-binding poll of its residents regarding their support for use of the Oxitec solution under the FDA approval.

The ad says: "Do you know over 3 million GM Mosquitoes were released in the Cayman Islands in 2009 & 2010 with no widespread public awareness?"

In fact: There were community engagement activities in East End before releasing mosquitoes in the area in 2009 and 2010. Oxitec and MRCU are engaged in a full communication programme to ensure the public is aware of the control programme, the technology, and the goal.

The ad says: "What is the current prevalence of the Zika, dengue and chikungunya virus in the Cayman Islands and what are the risks of those virus types manifesting in the Cayman Islands in the future?"

In fact: Dengue and chikungunya have previously appeared in Cayman at low levels. The first Zika case was recently confirmed in a visitor from Amsterdam and is presumed to have been sexually transmitted, while the visitor was in the Cayman Islands, from her boyfriend who had joined her on vacation and who resides in St. Maarten where the Zika virus is prevalent.

The ad says: "What are the risks of spreading diseases by biting females?"

In fact: Oxitec's protocols are designed to minimise the likelihood of female release. In the event female mosquitos were released, it is extremely unlikely that a released female of the Oxitec GM mosquitoes could survive long enough in the environment to spread disease because they only live 2-4 days and it takes 5-10 days to contract these viruses.

The ad says: "What are the risks of releasing 22 million genetically modified, non-native strain mosquitoes?"

In fact: The Cayman Islands National Conservation Council (NCC) has reached the conclusion that the risks are insignificant. The expected outcome is a reduction in the wild, non-native strain mosquitoes, which can transmit Zika, dengue and chikungunya.

The ad says: "What is the risk that wild type *Aedes aegypti* mosquitoes migrate to surrounding areas in response to the releases?"

In fact: This has not been observed in any previous projects and is highly improbable as mosquitoes travel less than 200 yards on average in their lifetime.

The ad says: "What are the risks of increasing other mosquito strains if the *Aedes aegypti* mosquitoes are suppressed?"

In fact: This has not been observed in any previous project. Even if it did occur, the other mosquitoes are far less dangerous than *Aedes aegypti* which is the primary vector for a number of dangerous arboviruses including Zika, dengue, yellow fever, and chikungunya.

The ad says: "What is the potential impact on the Cayman Islands ecosystem and what independent assessments have been conducted?"

In fact: Suppressing or even eradicating the non-native species *Aedes aegypti* will not have a harmful impact on the Cayman Islands ecosystem. In Cayman, assessments were conducted by the Departments of Agriculture and Environment. Since the implementation of the National Conservation Law it has been further reviewed by the National Conservation Council.

The ad says: "What would be the impact in the event of the failure of the killing mechanism due to tetracycline in the environment and/or evolution of resistance or other reasons as yet undiscovered?"

In fact: There is not enough tetracycline in the environment to inhibit the killing mechanism of the self-limiting gene. Any hypothetical localised contamination would mean diminished efficacy of this tool just in that local area. There is no evidence to date of resistance; if this arose the releases would have diminishing efficacy. Whether for these reasons or the hypothetical undiscovered reasons for reduced efficacy, the releases would still be safe, the field monitoring would detect the problem and if releases stopped, the GM mosquitoes would disappear from the environment.

Further information
Diseases spread by the *Aedes aegypti* mosquito

- Dengue fever infects an estimated 400 million people globally every year with about half of the world's population at risk.
- Chikungunya swept into Central America and the Caribbean in 2014 with an epidemic spiking to over a million cases within only a year.
- Zika virus is rapidly spreading into new countries and has caused a state of emergency in Brazil where it has been linked to a sudden increase in birth defects (microcephaly) and nervous system disorders (Guillain-Barré syndrome).
- Yellow fever, also carried by *Aedes aegypti*, remains a major health threat. Globally, there are an estimated 200,000 cases of yellow fever, causing 30,000 deaths each year, with 90% cases occurring in Africa.



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About MRCU

The Mosquito Research and Control Unit (MRCU) was established in 1965 to suppress mosquito populations so as to minimise discomfort from mosquito biting, to protect residents and visitors from mosquito-borne disease, and thereby enhance the quality of life and promote the economy of the Cayman Islands. The department has many years' experience in utilising integrated control to reduce the risk of local transmission of mosquito-borne diseases.



OXITEC

About Oxitec

Oxitec is a pioneer in using genetic engineering to control insect pests that spread disease and damage crops, and was founded in 2002 as a spinout from Oxford University (UK). Oxitec is a subsidiary of Intrexon Corporation (NYSE: XON), which engineers biology to help solve some of the world's biggest problems.



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