FKMCD-Oxitec Public Educational Webinar #15

Preparing for Project B Launch of the FKMCD-Oxitec Mosquito Project

30 June 2021

FLORIDA Mosquito Control DISTRICT KEYS

OXITEC

Introductions – Panelists With You Today

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FKMCD-Oxitec Public Educational Webinar Series

FKMCD and Oxitec are hosting a series of public educational webinars to share information with residents of the Florida Keys and provide forums to answer questions.

- Webinars are open to everyone.
- Webinars are recorded and made available for everyone after the event.
- All questions relating to the webinar topic(s) will be answered (some in batches if questions are similar).
- If time runs out, we will accept questions in writing via florida@oxitec.com.
- Questions and answers will be published in writing after the event with external or related online resources/references.

Welcome to Webinar #15!

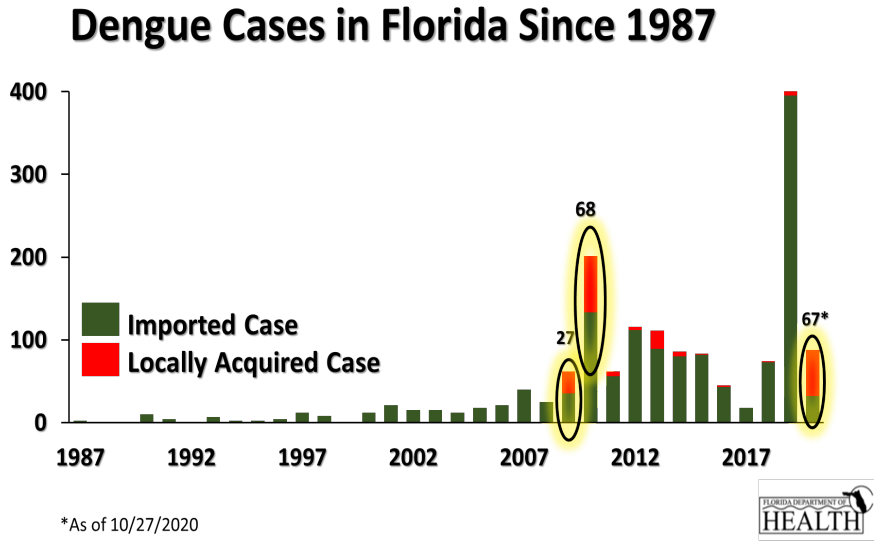
Today's Agenda:

- Preparing for Project B Launch
- From the laboratory to the backyard: how Oxitec's mosquito eggs are created and prepared for deployment in the Florida Keys
- Pesticide resistance in mosquitoes: how it happens and why it's important to address the problem now
- Your Questions Answered

Documentation, resources, references, and other information are available at keysmosquitoproject.com

Why now, Why the Florida Keys? – Health and the Environment

- Dengue is an ongoing challenge with over 65 confirmed locally-acquired cases in Monroe County in 2020
- The threat of other diseases such as Zika, chikungunya and yellow fever persists
- Insecticide resistance in local mosquitoes
- Need more tools in our toolbox

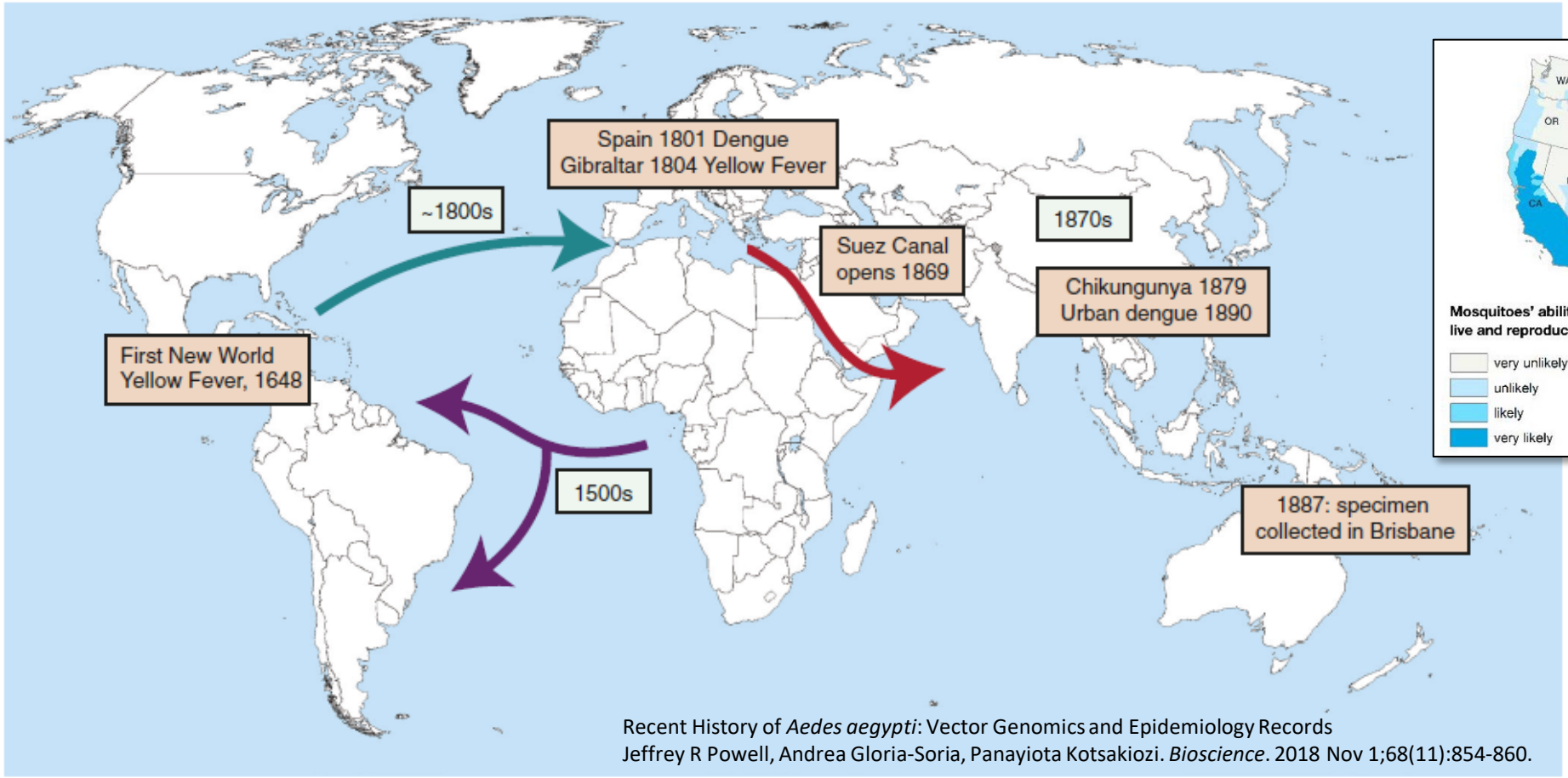


- Environmental impact is a major consideration, including for human health
- Using species-specific tools minimizes harmful impacts
- Nine national and state agencies concluded Oxitec male mosquitoes pose no risk to human or environmental health

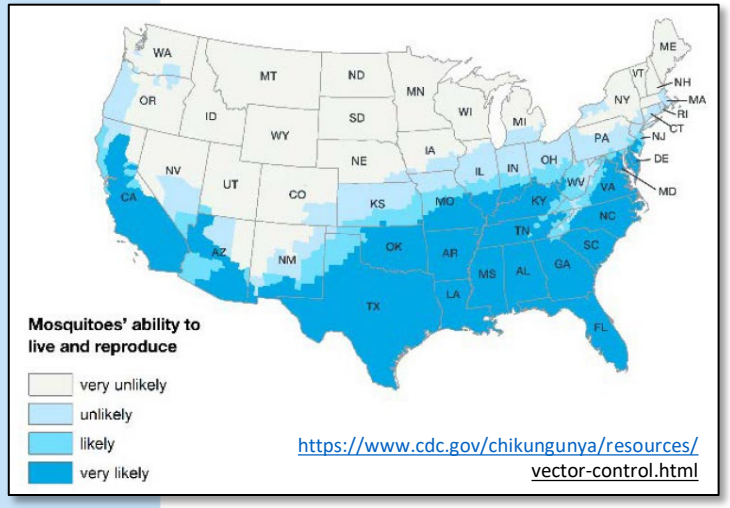
Endangered Schaus' swallowtail butterfly lives near the recent dengue outbreak

The *Aedes aegypti* Mosquito: an Invasive Species in Florida

***Aedes aegypti* is not native to the Americas.** It was most likely transported from Africa by Portuguese ships sometime in the 16th century, **bringing viral diseases with it.**

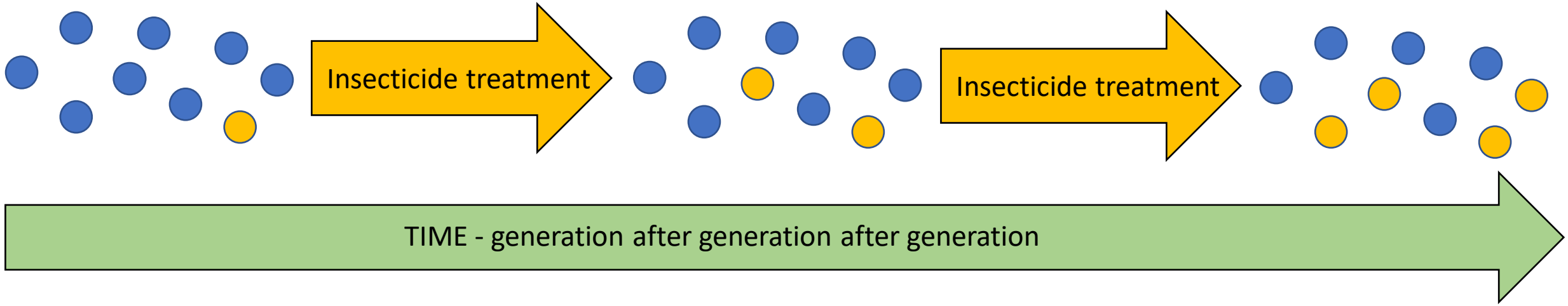


Recent History of *Aedes aegypti*: Vector Genomics and Epidemiology Records
Jeffrey R Powell, Andrea Gloria-Soria, Panayiota Kotsakiozi. *Bioscience*. 2018 Nov 1;68(11):854-860.



Aedes aegypti in Florida and surrounding U.S. states today.

Pesticide Resistance in Mosquitoes: How it Happens in a Population



Susceptible (wild-type)

Resistant (due to naturally occurring mutations)

Important terms & concepts

Mutation

Selection pressure

Fitness cost

Pesticide Resistance in Mosquitoes: Why it's Important to Address

RESEARCH ARTICLE

Quantification of permethrin resistance and *kdr* alleles in Florida strains of *Aedes aegypti* (L.) and *Aedes albopictus* (Skuse)

Alden S. Estep[1]*, Neil D. Sanscrainte[2], Christy M. Waits[1], Sarah J. Bernard[1], Aaron M. Lloyd[3], Keira J. Lucas[4], Eva A. Buckner[5¤], Rajeev Vaidyanathan[6], Rachel Morreale[7], Lisa A. Conti[8], James J. Becnel[2]

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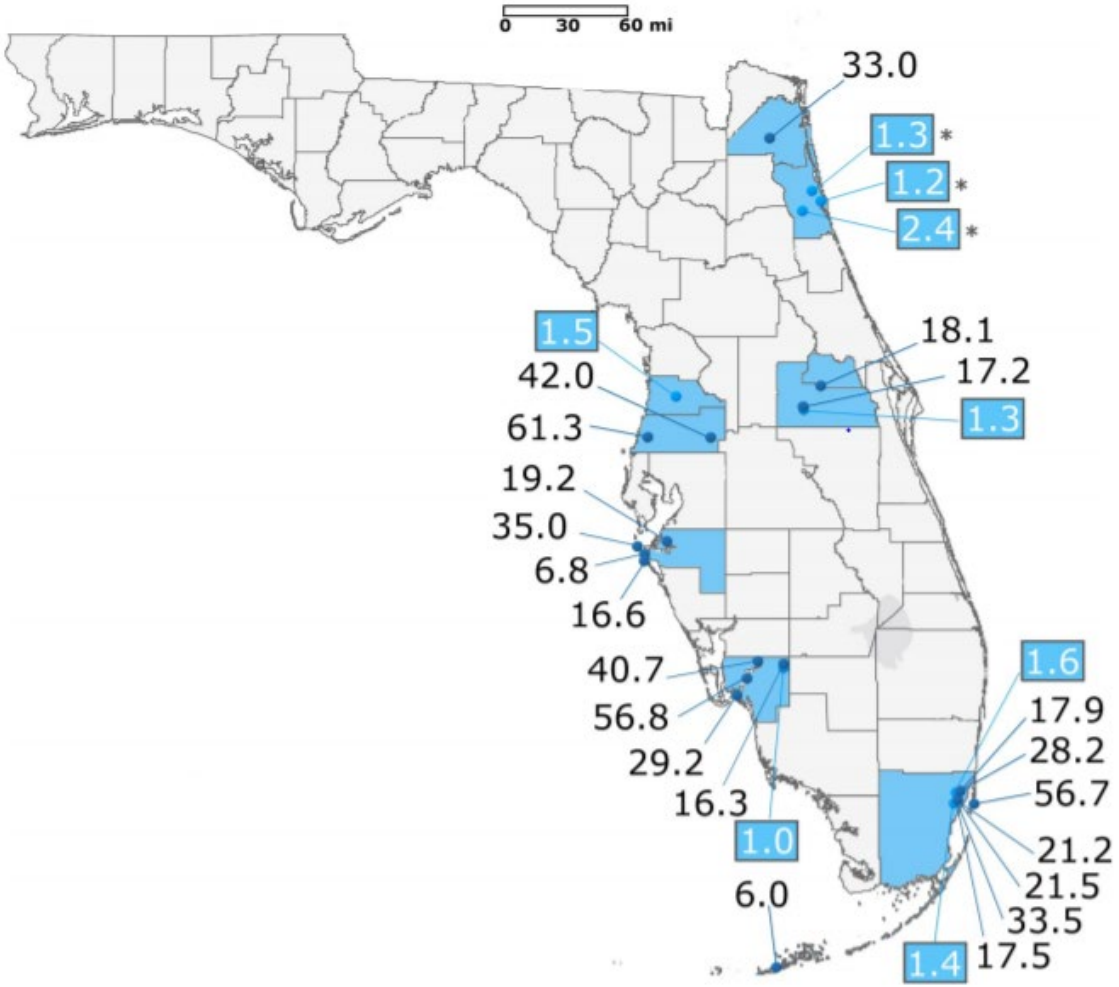
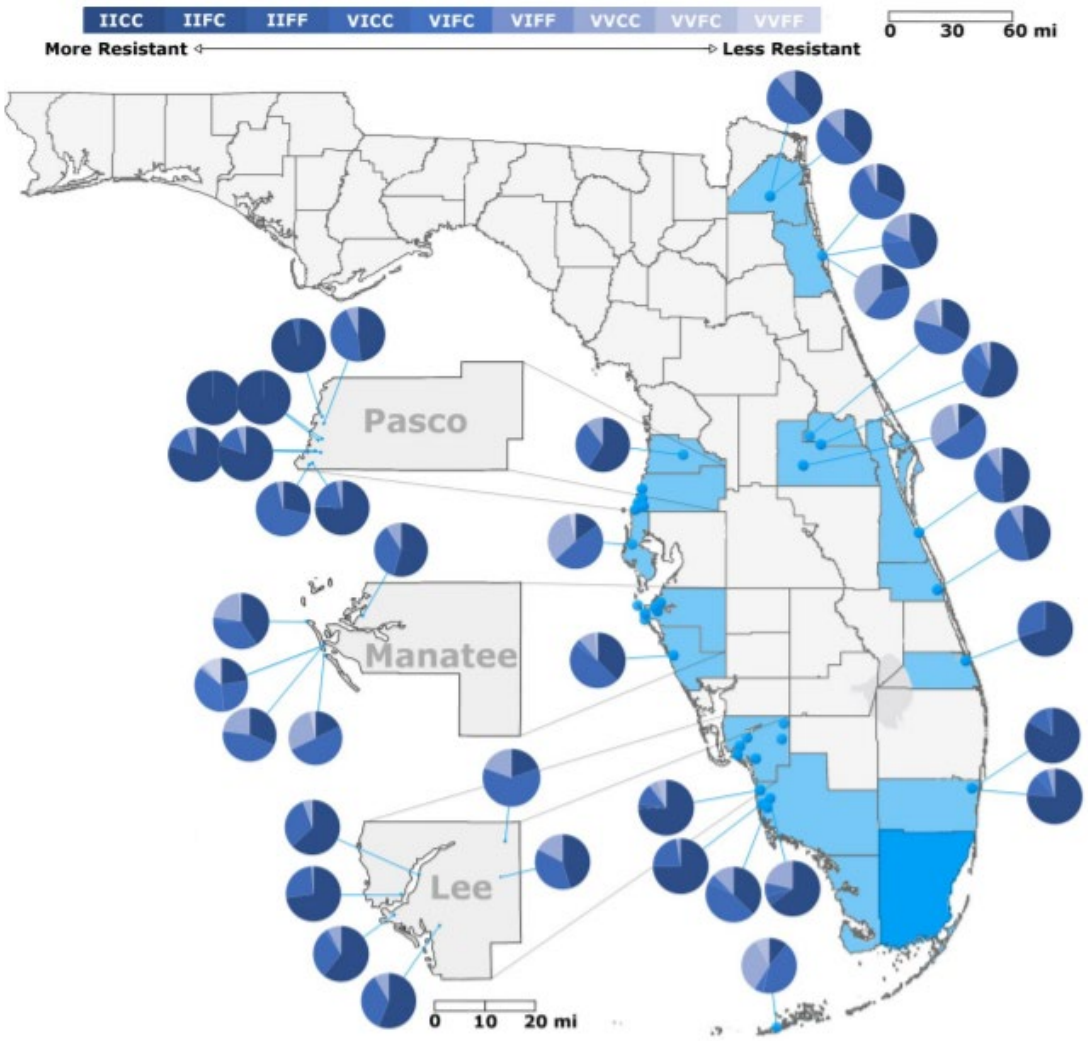
Pesticide Resistance in Mosquitoes: Why it's Important to Address



"Resistance ratio" or RR is the amount of insecticide needed to kill 50% of field-collected mosquitoes divided by the amount needed to kill 50% of a susceptible strain of the same species.

RR < 5 is susceptible
RR between 5 and 10 is moderately resistant.
RR > 10 is highly resistant.

Pesticide Resistance in Mosquitoes: Why it's Important to Address



Genetic analyses

Darker blue is more resistant, lighter blue is more susceptible.

We looked at the frequency of mutations associated with resistance in *Aedes aegypti* across Florida.

- There is significant heterogeneity (variability) in any one county, complicating control efforts.
- The presence of resistant genes is widespread throughout Florida.

Pesticide Resistance in Mosquitoes: Take-Home Message

Resistance to pyrethroid insecticides, the most common class of insecticides for mosquito control, is widespread in *Aedes aegypti* in Florida and elsewhere. Because of pyrethroid resistance AND the intimate association of this species with people's homes, targeted control of this species is difficult. New tools would be helpful in targeting this invasive species.

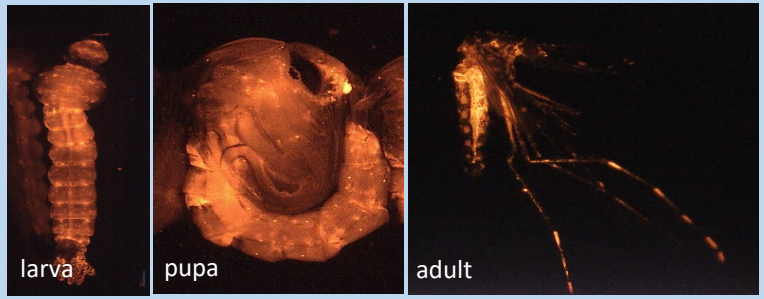
Oxitec's Mosquito Technology

OXITEC'S *AEDES AEGYPTI*

- ✓ TARGETED SUPPRESSION
- ✓ SAFE, NON-TOXIC, NON-ALLERGENIC
- ✓ PROVEN EFFECTIVENESS
- MALE-ONLY RELEASES (male mosquitoes do not bite) ✓
- TRACEABLE IN THE FIELD ✓
- SELF-LIMITING IN THE ENVIRONMENT ✓

- No females produced
- Low-tech, egg-based devices

- Easy track-and-trace in the field
- Non-toxic, non-allergenic



FKMCD-Oxitec Pilot Project

Purpose

1. Broaden the toolbox to protect communities against invasive species and diseases
2. Preserve quality of life and the delicate Florida Keys ecosystem
3. Evaluate this safe, innovative tool for fighting *Aedes aegypti*

Project Components

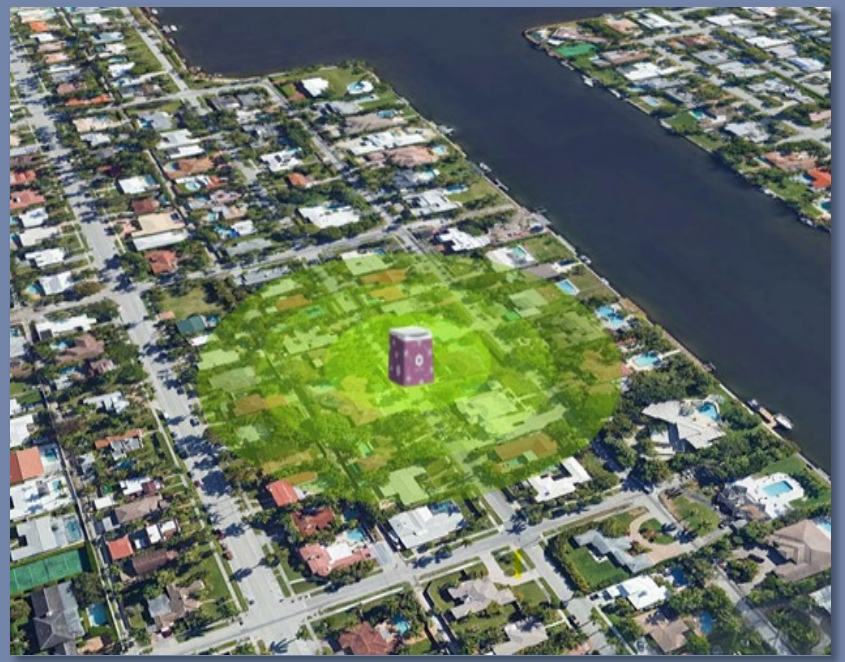
1. Community Engagement
2. Project A: Single-point Releases
3. Mark-Release-Recapture
4. Project B: Area-wide Releases

Project: Evaluate Oxitec's Aedes aegypti Just Add Water Technology

Project Locations and Mosquito Releases

PROJECT A

SINGLE POINT RELEASE



Single box placements in 6 small areas
~12 weeks
~12,000 mosquitoes per week across all areas

PROJECT A & B LOCATIONS

Project A: RAMROD KEY, CUDJOE KEY (x2), VACA KEY (x3)

Project B: LOCATIONS STILL TO BE CONFIRMED

TRAP TO COLLECT MOSQUITO EGGS

TRAP TO COLLECT MOSQUITO ADULTS

PROJECT B

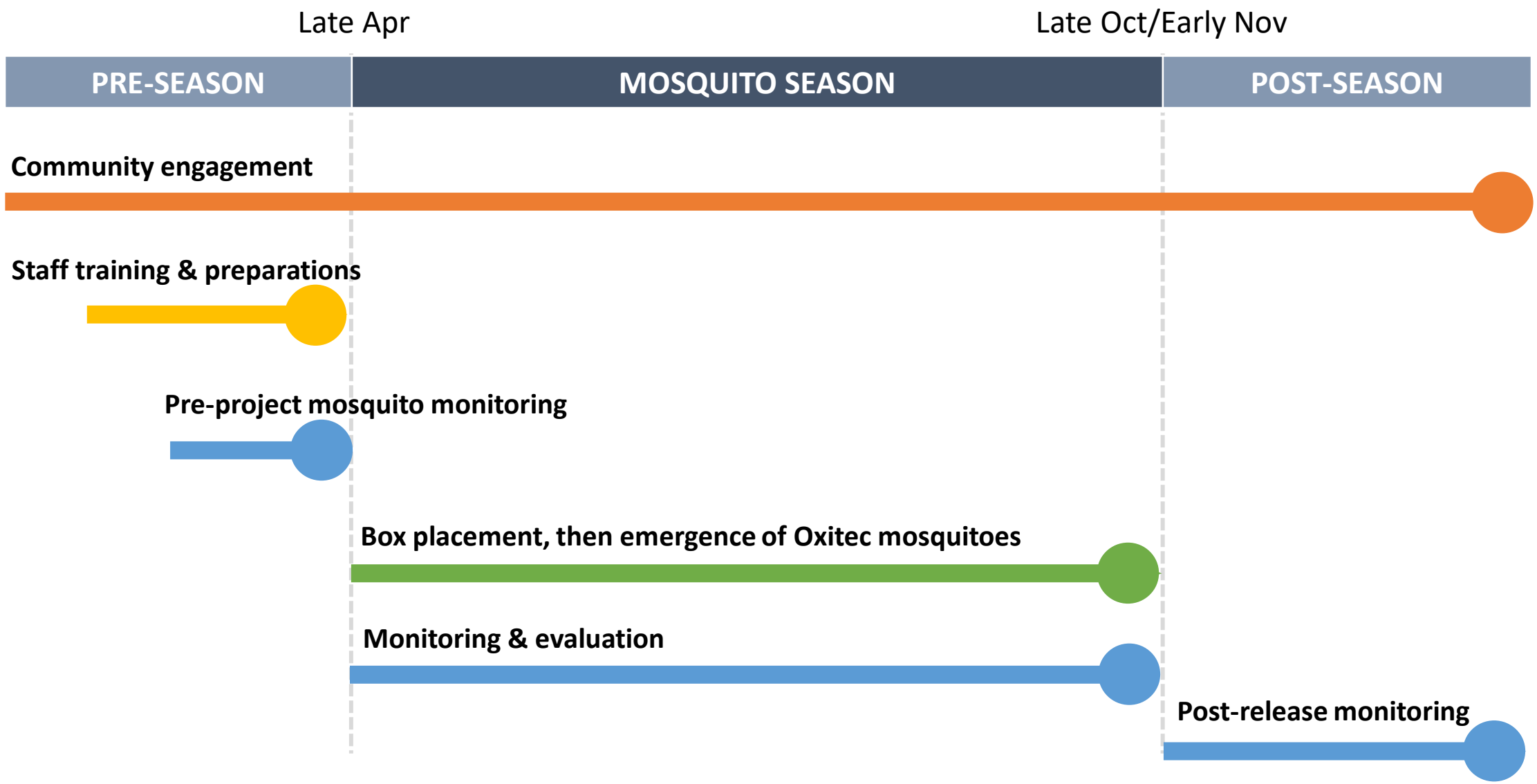
MULTIPLE RELEASE POINTS

Multi-box placements in 6 small areas
~16 weeks
Anticipated <200,000 mosquitoes per week across all areas

What To Expect Throughout The Summer

- Project A will continue for approximately 12 weeks
- Project B will host multiple boxes in small neighborhood release areas for an estimated 16 weeks
- After releases end, areas will be monitored until no Oxitec mosquitoes remain
- Following the end of mosquito releases, data analysis will be completed and shared with regulators

Florida Keys Pilot Project Timeline - 2021



Recent Community Engagement

Project to Control Disease-Carrying Mosquitoes Kicks…

60 views • 5 days ago

FKMCD - #Oxitec Mosquito Project Update: Emergenc…

2.7K views • 1 week ago

FKMCD - #Oxitec Public Educational Webinar #13

66 views • 3 weeks ago

FKMCD - #Oxitec Public Educational Webinar #12

48 views • 1 month ago

FKMCD - #Oxitec Public Educational Webinar #11

83 views • 2 months ago

FKMCD - #Oxitec Public Educational Webinar #10:…

90 views • 3 months ago

FLORIDA Mosquito Control DISTRICT KEYS

OXITEC

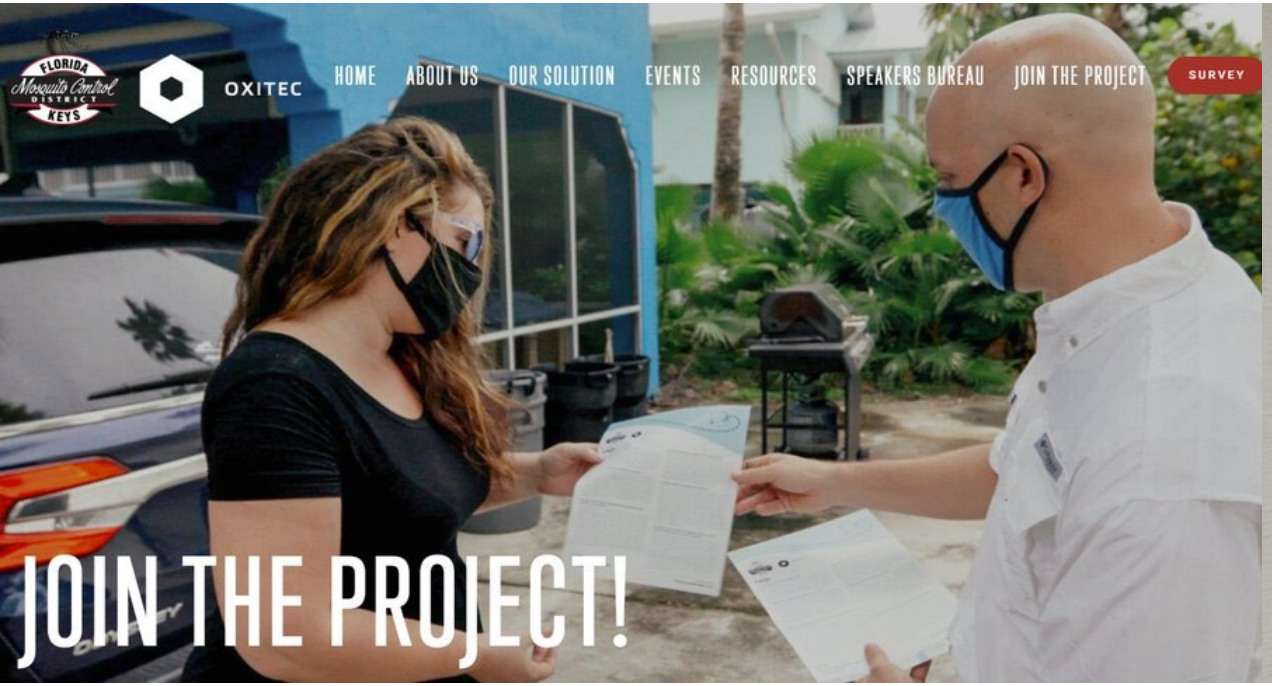
Beginning in spring 2021, the Florida Keys Mosquito Control District (FKMCD) and Oxitec will evaluate the effectiveness of Oxitec mosquitoes to control the invasive, disease-spreading *Aedes aegypti* mosquito in the Florida Keys.

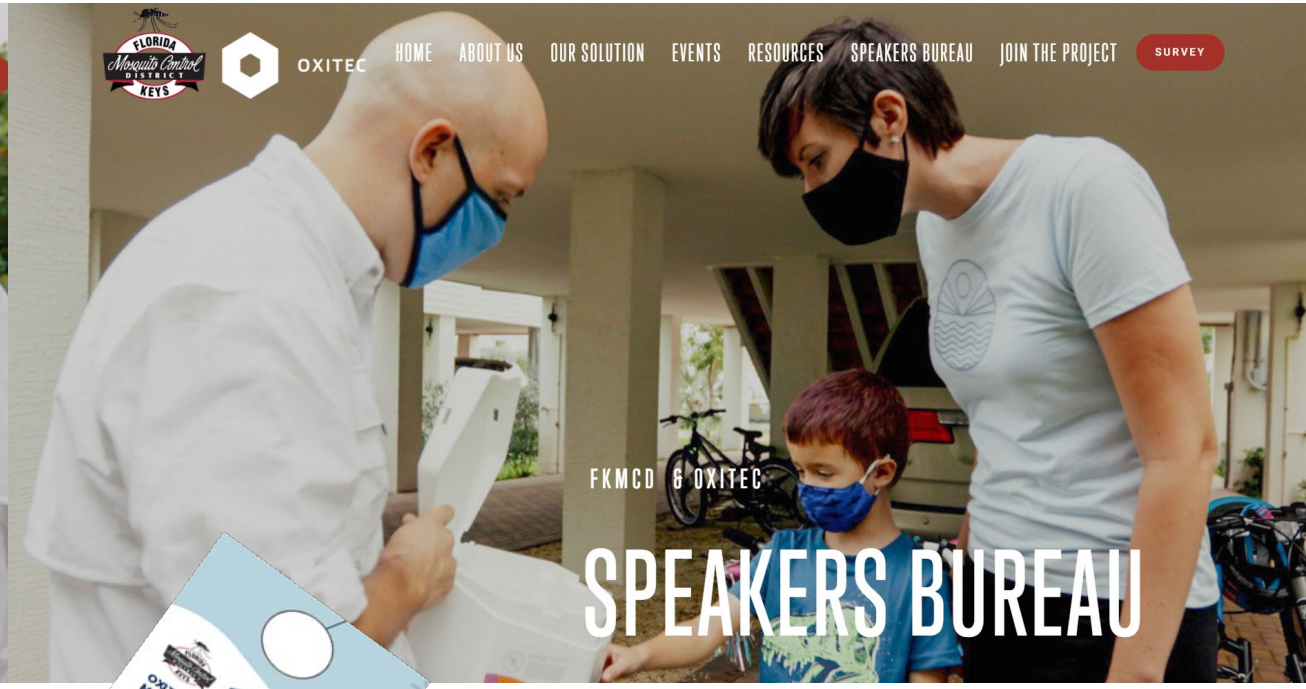
- Oxitec mosquitoes are safe and self-limiting.
- Like all male mosquitoes, **Oxitec's male mosquitoes do not bite.** Female mosquitoes bite spread disease.
- The *Aedes aegypti* mosquito is the known vector of diseases including **Dengue** and **Zika** ar becoming more resistant to traditional pesticides.

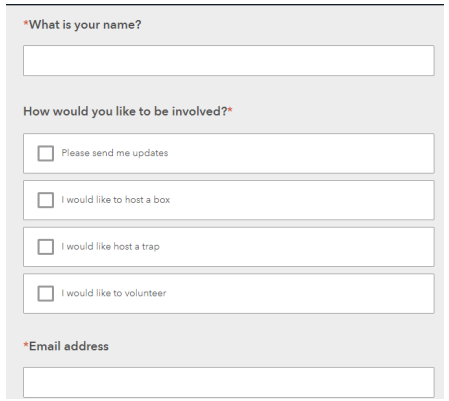
Please visit **keysmoquitoproject.com** for additional resources.

PLEASE TURN OVER TO LEARN MORE! ---------->

Get Involved!







- ✓ Request a box
- ✓ Request a trap
- ✓ Sign up for updates
- ✓ Volunteer as a Project Ambassador

Learn More:

keysmosquitoproject.com

Question and Answer

Any and all questions on this evening's topics are welcome!

(If we run out of time tonight, email florida@oxitec.com and we will attempt to answer your question if it isn't included in the growing FAQ or post-event summary, we publish online at oxitec.com/florida and keysmosquitoproject.com)