FKMCD-Oxitec Public Educational Webinar #10

Preparing for the FKMCD-Oxitec Pilot Project: Overview of Field Design and Management

26 January 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

Upcoming:

1. **Roundtable Discussion: Controlling *Aedes aegypti*, the Vector of Dengue, Zika, Heartworm and Other Diseases** – coming in February!
2. **Community Partnerships: The Role Communities Play in our Pilot Project** – coming in March!

Welcome to Webinar #10!

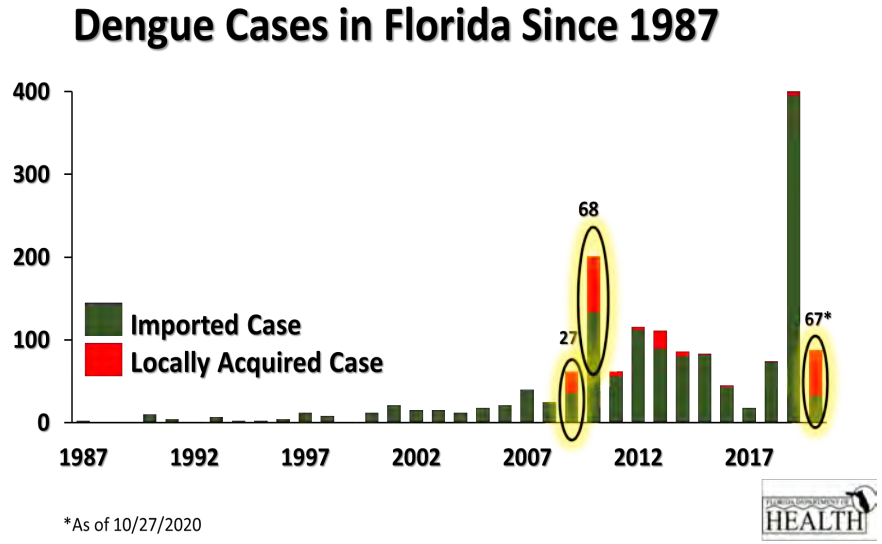
Today's Agenda:

- Preparing for the FKMCD – Oxitec Pilot Project
- Overview of Field Design and Management
- Your Questions Answered

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

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

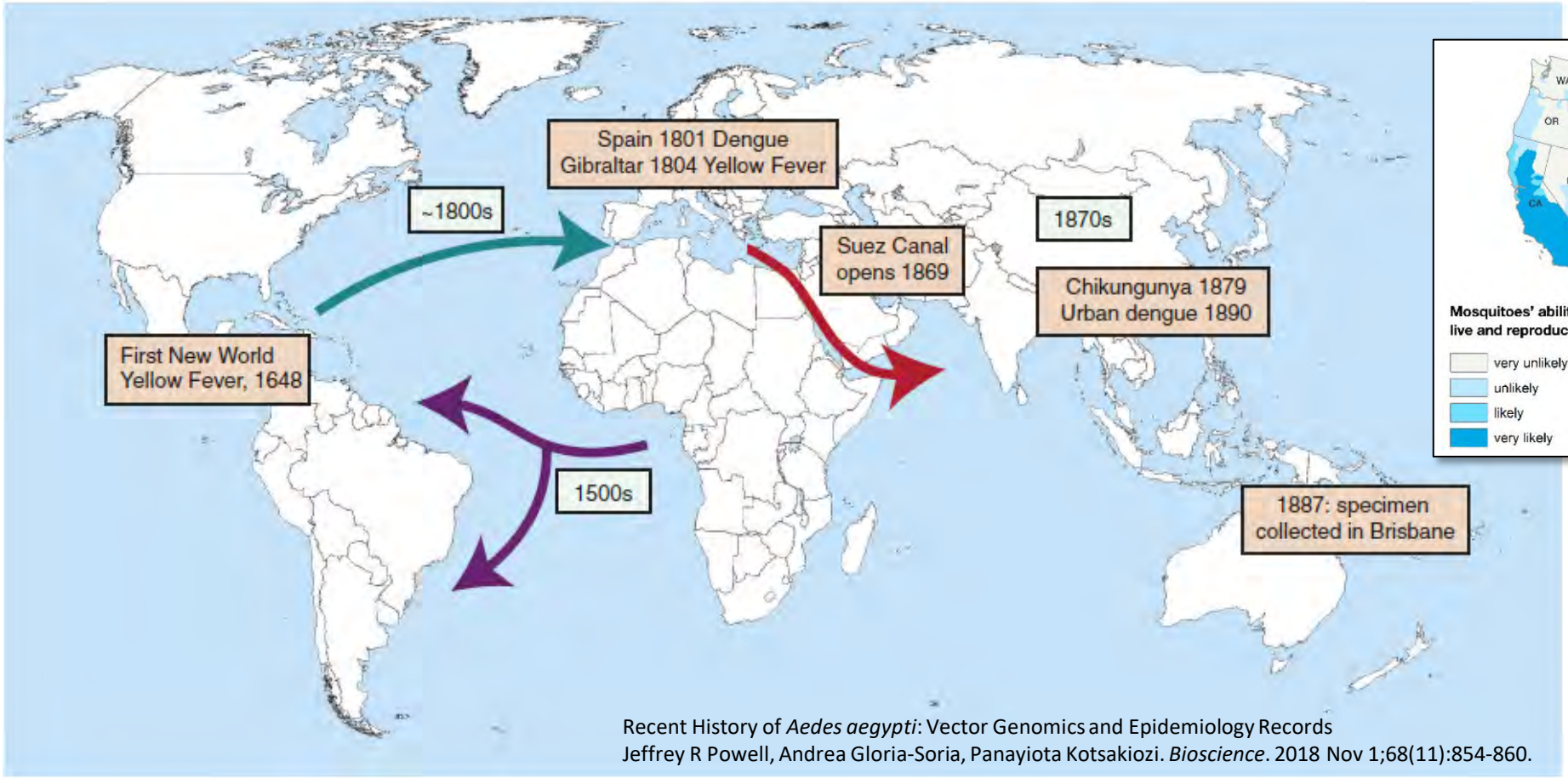
- Dengue is an ongoing challenge with over 65 confirmed locally-acquired cases in Monroe County in 2020
- The threat of other diseases such as Zika, chikungunya and yellow fever persists
- Insecticide resistance in local mosquitoes
- Need more tools in our toolbox
- Environmental impact is a major consideration,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



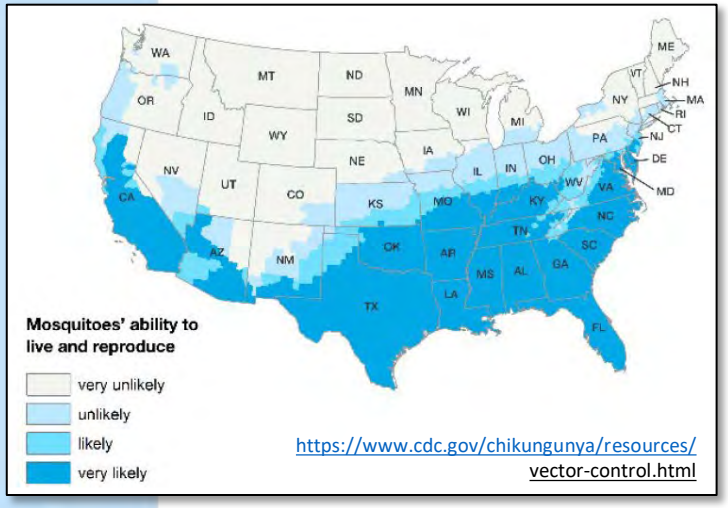
Endangered Schaus' swallowtail butterfly lives near the recent dengue outbreak

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.**



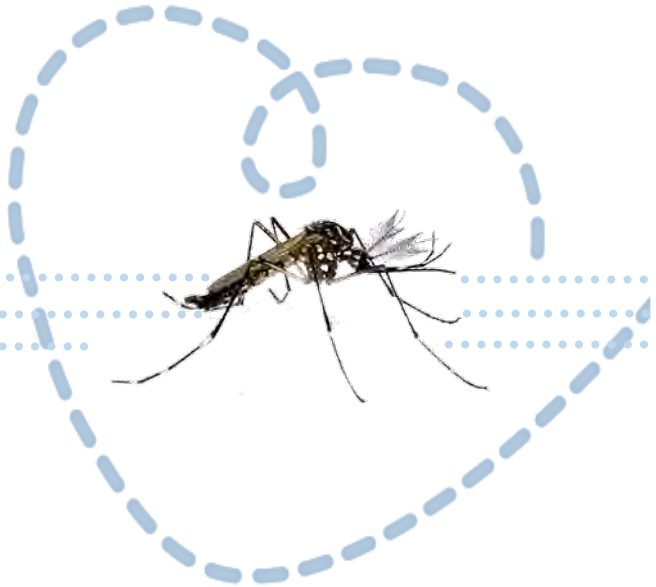
Recent History of *Aedes aegypti*: Vector Genomics and Epidemiology Records
Jeffrey R Powell, Andrea Gloria-Soria, Panayiota Kotsakiozi. *Bioscience*. 2018 Nov 1;68(11):854-860.



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

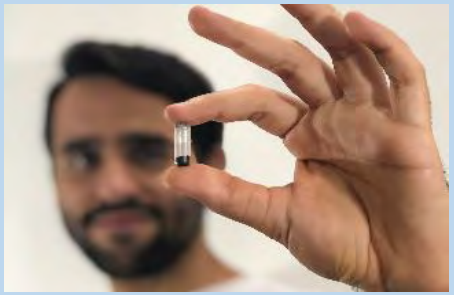
Oxitec's *Aedes aegypti* Mosquito Technology (OX5034)

OXITEC'S *AEDES AEGYPTI*

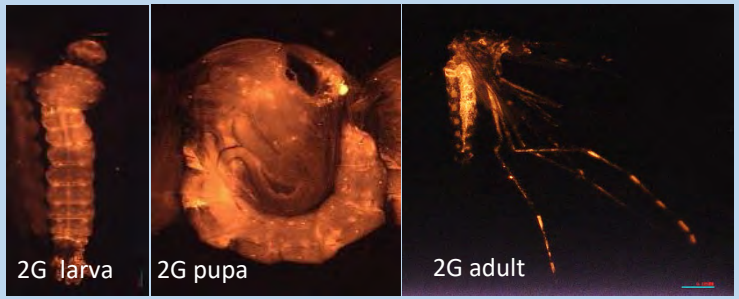


- ✓ TARGETED SUPPRESSION
- ✓ SAFE, NON-TOXIC, NON-ALLERGENIC
- ✓ PROVEN EFFECTIVENESS
- ✓ MALE-ONLY RELEASES (male mosquitoes do not bite)
- ✓ TRACEABLE IN THE FIELD
- ✓ SELF-LIMITING IN THE ENVIRONMENT

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



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



How Does the Self-Limiting Gene Work?

- Females cannot survive to adulthood
- Male OX5034 mosquitoes are unaffected
- Males pass on one copy of self-limiting gene to achieve significant suppression
- Male-only production reduces 90% of production complexity
- Enables egg release devices

20 million

male OX5034 mosquitoes released in Brazil

1 billion

OX513A mosquitoes produced for release globally

Zero

Negative Impact

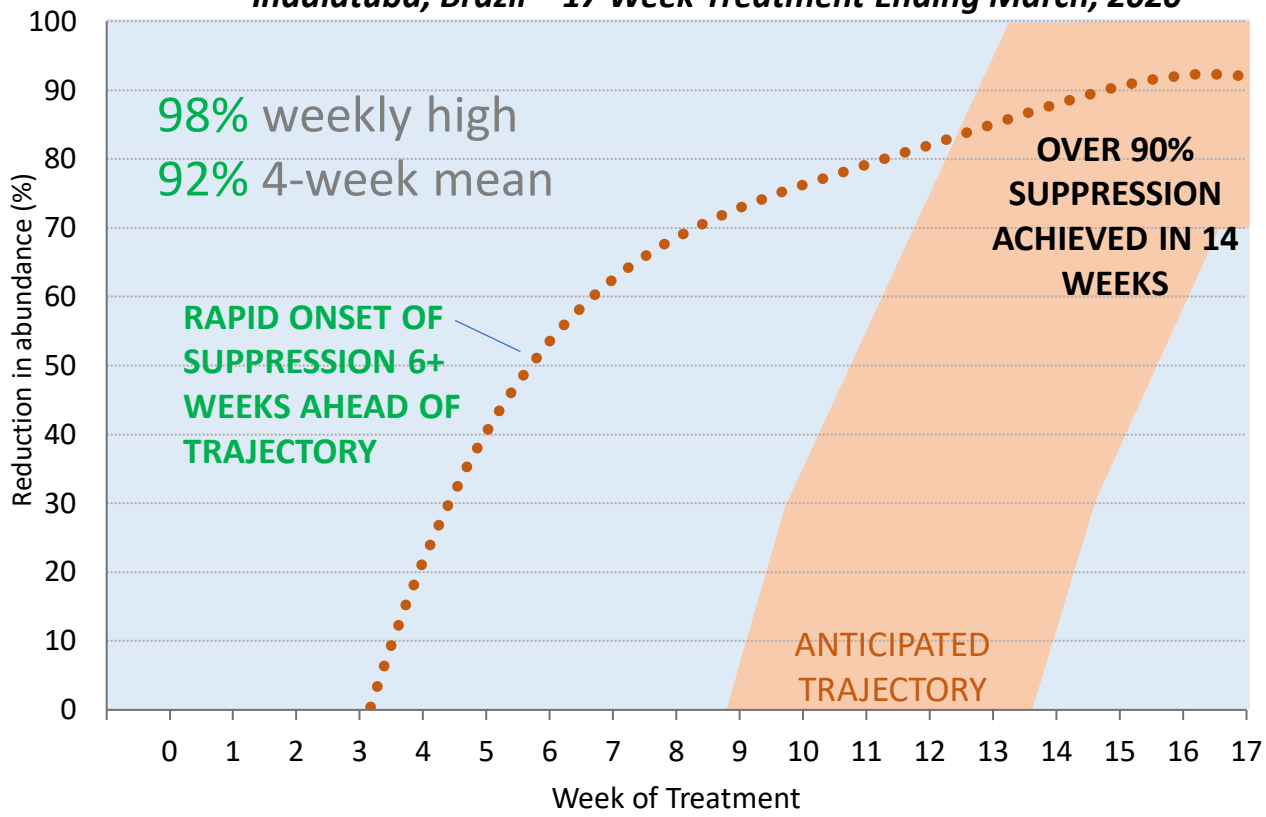
OX5034 Demonstrated Effectiveness & Safety

Results:

- ✓ Safe – no unintended impacts
- ✓ Males only – no female release
- ✓ Fully self-limiting – no persistence
- ✓ Significant suppression (see graph)
- ✓ 90% reduction in operations
- ✓ 94%+ public acceptance

Pilot Project #1 for Mini-Capsule Product – 1,000 Person Area

Indaiatuba, Brazil – 17 Week Treatment Ending March, 2020



6 Weeks Faster to Suppression than OX513A

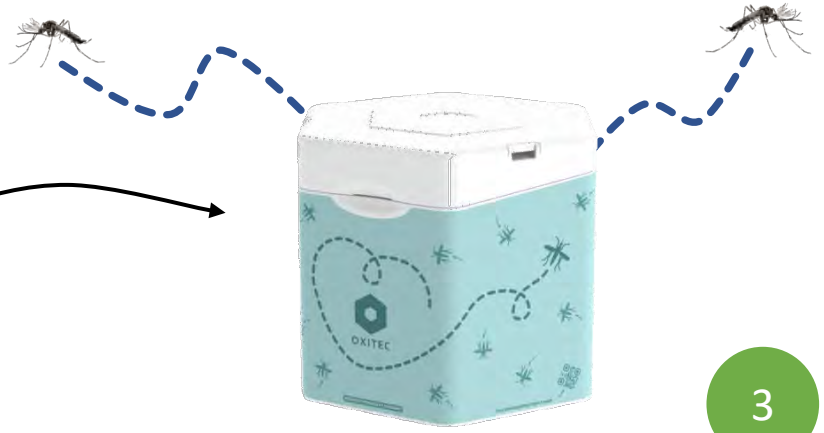
90% More Efficient Production & Deployment

How Are OX5034 Mosquitoes Delivered to the US?

EGGS PACKAGED IN MINI CAPSULES

1

2



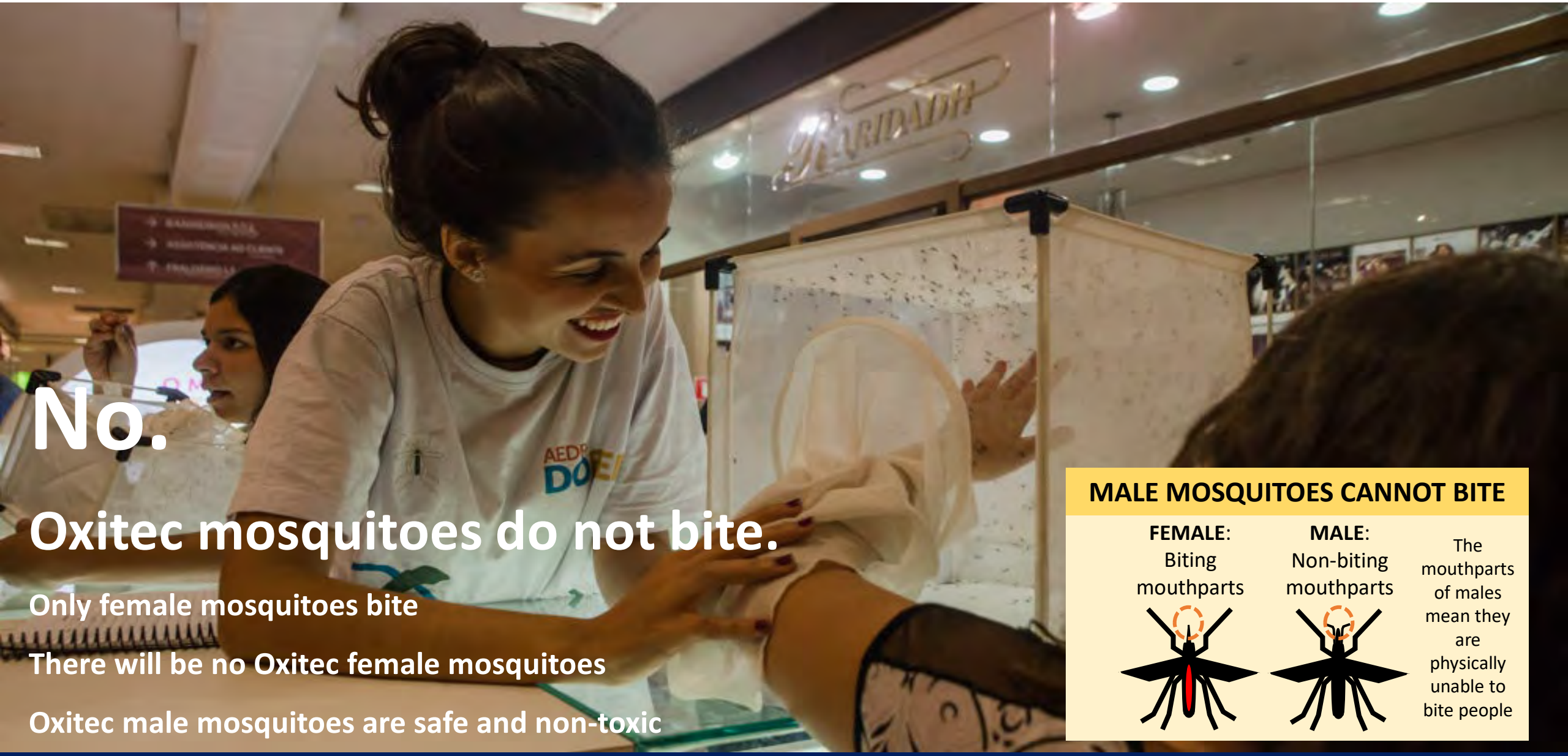
3

BOXES ARE PLACED BY DISTRICT/OXITEC OPERATORS

4

- ✓ No female release & no biting
- ✓ Only male adults in the box
- ✓ **No tetracycline in the box**
- ✓ **No tetracycline in Florida**
- ✓ Boxes will be placed in out-of-the-way areas

Do Oxitec Mosquitoes Bite?



No.

Oxitec mosquitoes do not bite.

Only female mosquitoes bite

There will be no Oxitec female mosquitoes

Oxitec male mosquitoes are safe and non-toxic

MALE MOSQUITOES CANNOT BITE

FEMALE: Biting mouthparts

MALE: Non-biting mouthparts

The mouthparts of males mean they are physically unable to bite people

How Oxitec Manages Field Pilots & Data Collection

1

Regulatory Pilots

Small | high statistical power | protocol approved by regulators | biology/efficacy measured

2

Demonstration Pilots

Larger pilot to demonstrate area-wide performance | designed w/ regulator | compared with control

3

Operational Deployment

Deployed as vector control tool to suppress vector population over an area

How We Measure Performance

OX5034 performs like a larvicide.

It only kills female larvae of the next generation.

METRIC	DESCRIPTION	USEFUL FOR
Abundance	The number of wild *Ae. aegypti* in a trap	Checking baseline population levels and changes
Overflooding ratio	The ratio of Oxitec males to wild males	Achieving optimal dose rate
Mating fraction	The proportion of females mated by Oxitec	Evaluating the proportion of the population treated
Efficacy	The percentage of treated females that die	Confirming 100% effective against treated females

How We Collect Data

1 Egg Collection Ovitraps

Small plastic cups

Monitors the numbers of eggs laid by *Ae. aegypti* females

2 Adult Mosquito Collection

Captures adults

Monitors ratios and numbers of *Ae. aegypti* adults

3 Lab-based Monitoring/QC

Stereo microscopes

Used to track performance and confirm quality

FKMCD-Oxitec Pilot Project

Purpose

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

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

Just add water: Safe, non-biting males are hatched in small boxes using small mini-capsules.

Project Components

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

~130
Boxes Placed

~28
Weeks Total

0
Females Released

Project Locations and Mosquito Releases

Project A (single-point release)

- 1 box per week
- 9 small areas
- ~12 weeks

Project B (multi-point release)

- Small number of devices placed per week in up to 6 areas
- ~16 weeks

Pilot Project Design

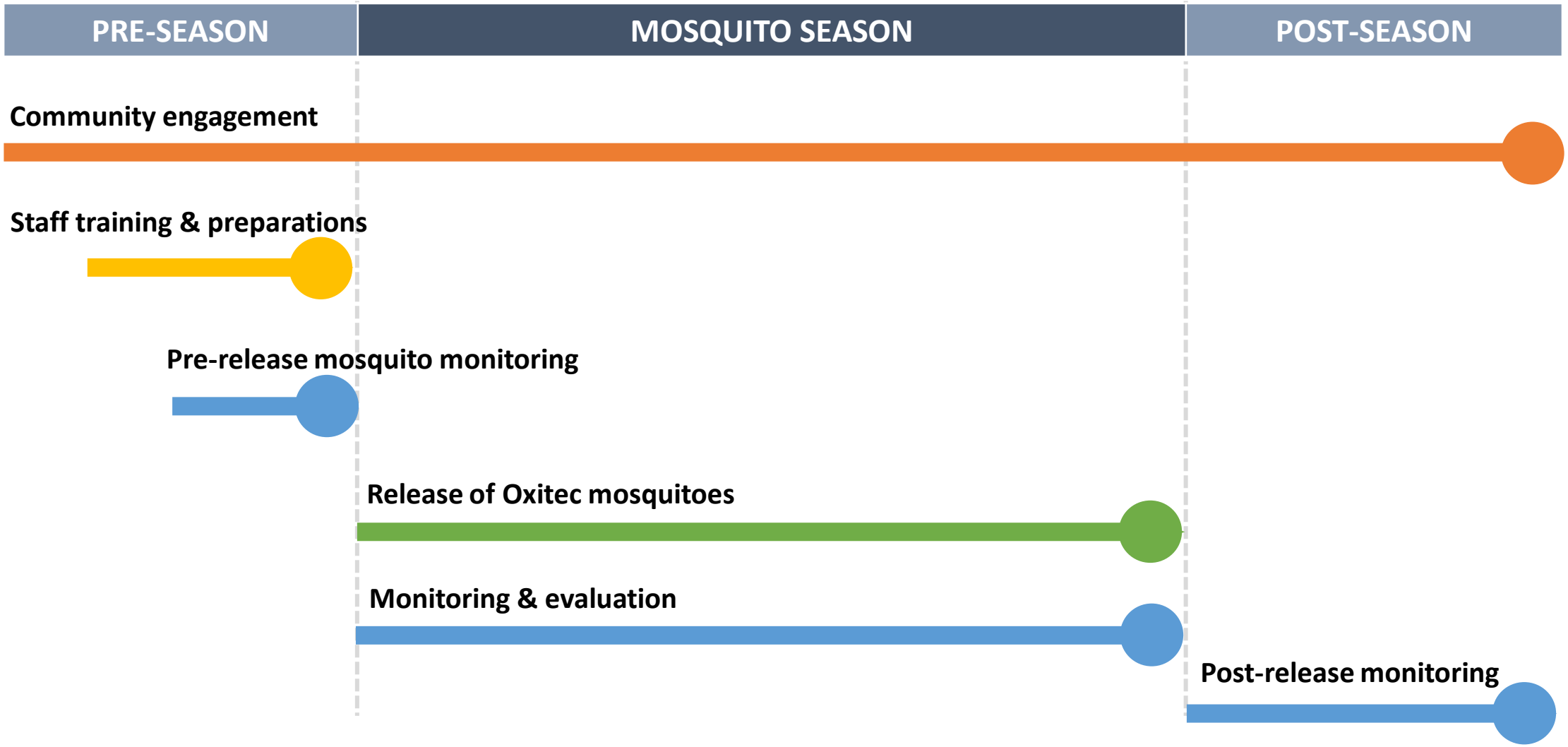
Project Design Elements

1. Single-point release, trapping males and offspring
2. Multi-point release, trapping offspring
3. Replicated and compared to untreated areas
4. Specific locations to be determined
5. Timing: 2021-2022 (including baseline monitoring)

Evaluation Elements

1. Male flight range and longevity
2. Duration of effect (residual activity)
3. Evaluation of natural breeding sites
4. % kill of female mosquitoes
5. % of the wild population treated

Florida Keys Pilot Project Timeline - 2021



Recent Community Engagement

FKMCD - #Oxitec Public Educational Webinar #9:...

51 views • 1 month ago

FKMCD - #Oxitec Public Educational Webinar #8:...

90 views • 2 months ago

Virtual Tour: Inside #Oxitec Labs Worldwide

458 views • 2 months ago

FKMCD - #Oxitec Public Educational Webinar #7:...

68 views • 2 months ago

Get Involved!

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

Question and Answers

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)