



**22nd FKMCD-Oxitec Public Educational Webinar:
Takeaways from 2022, Planning for 2023
Thursday, March 30th 2023**

Introductions – Panelists With You Today



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FKMCD-Oxitec Public Educational Webinar Series

Introduction to our 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.

FKMCD & Oxitec Public Educational Webinars

Welcome to Webinar #22!

Today's Agenda:

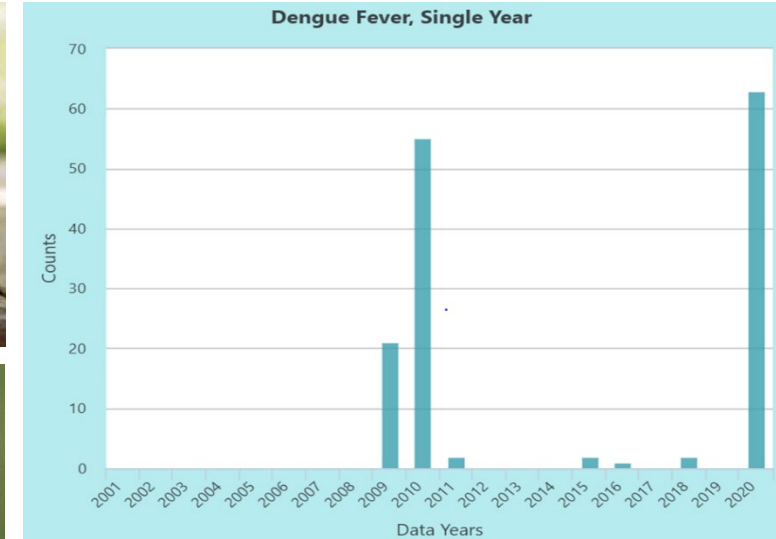
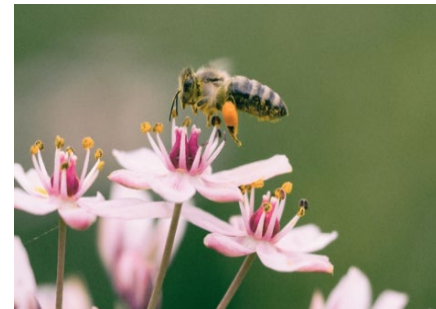
- Takeaways from the 2022 Project – What Did We Achieve?
- Plans for 2023.
- Your Questions, Answered.

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

Why Now, Why the Florida Keys?

Health & the Environment

- **Dengue** is an ongoing challenge with **68 locally-acquired cases in Florida in 2022** (next slide).
- The threat of other diseases such as **chikungunya, Zika, yellow fever, and heartworm** persists.
- There is no cure or vaccine for many of the diseases transmitted by *Aedes aegypti* mosquitoes and insecticide resistance is a growing concern. More tools are needed.
- **Environmental impact** is a major consideration, so too is **human health**.
- Using **species-specific tools** minimizes harmful impacts.
- National agencies have concluded **Oxitec male mosquitoes pose no risk to human or environmental health**.



Locally acquired cases of dengue in Monroe County 2001-2020. FLHealthCharts.gov.

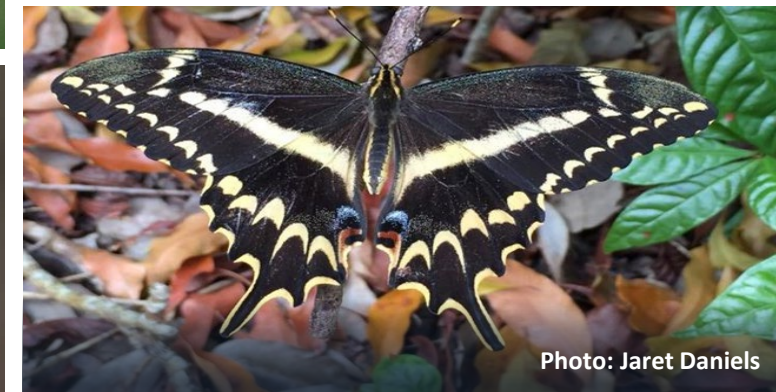


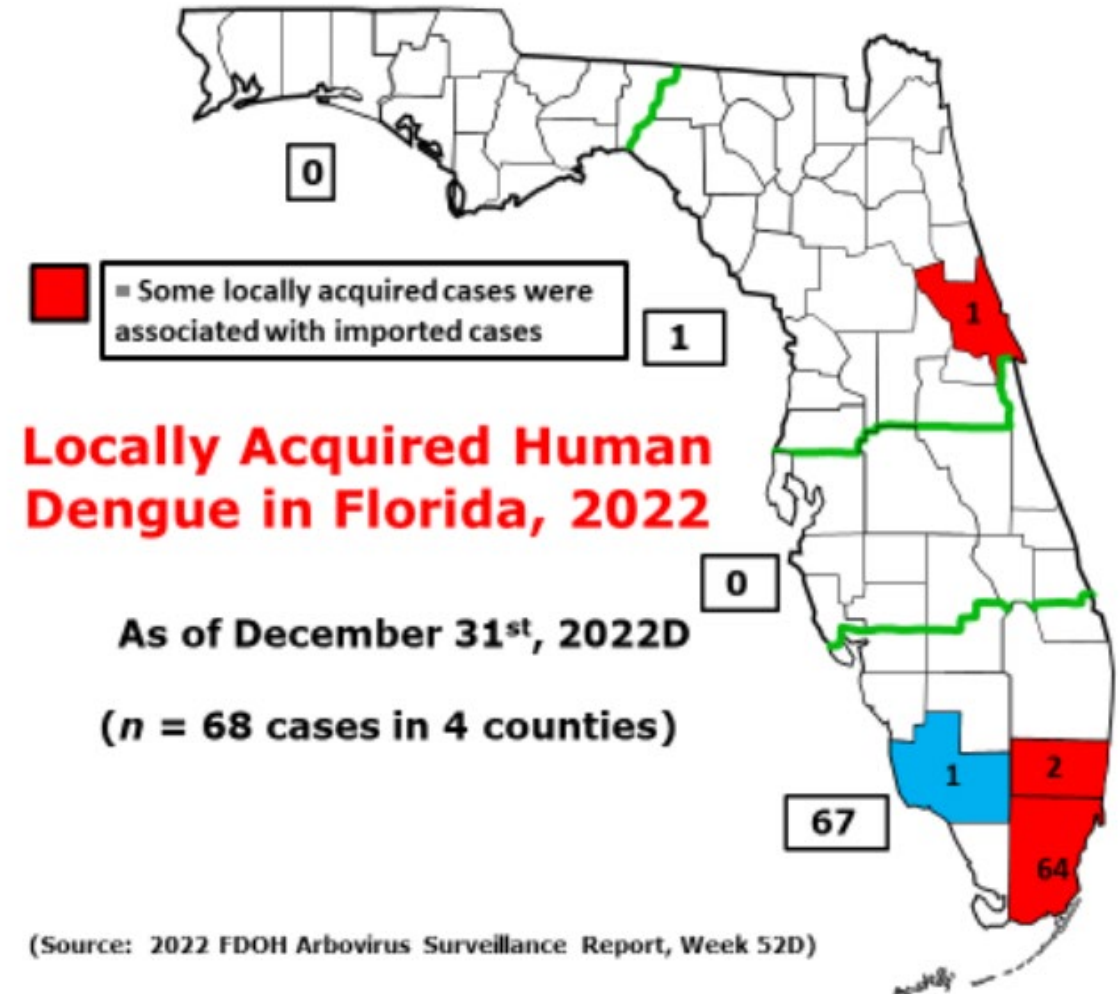
Photo: Jaret Daniels

Endangered swallowtail butterfly lives near the outbreaks

Why Now, Why the Florida Keys?

Dengue continues to threaten our communities. The majority of 2022 dengue cases occurred in South Florida:

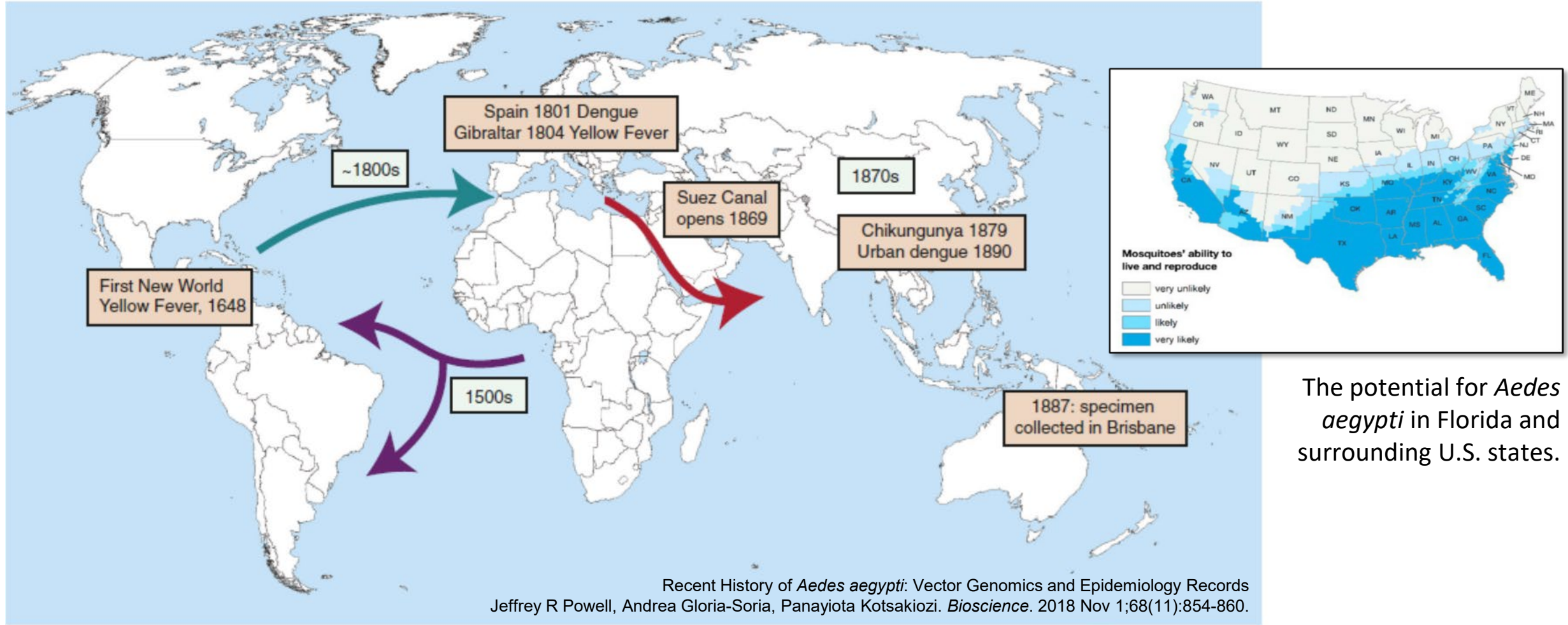
- 68 cases of locally acquired dengue were reported in Collier, Broward (2), Miami-Dade (64), and Volusia counties.
- In 2022, >750 travel-associated dengue cases were reported, which includes more than 500 reported from Miami-Dade County.



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

Aedes aegypti is not native to the Americas.

It was likely transported from Africa in the 16th century, bringing viral diseases with it.



The potential for *Aedes aegypti* in Florida and surrounding U.S. states.

Independent Validation of the FKMCD - Oxitec Mosquito Project

PROTOCOL DESIGN AND EVALUATION



Protocol design is driven by US regulatory agencies, who will also evaluate program results.

INDEPENDENT ADVISORY GROUP TECHNICAL AND OPERATIONAL OVERSIGHT



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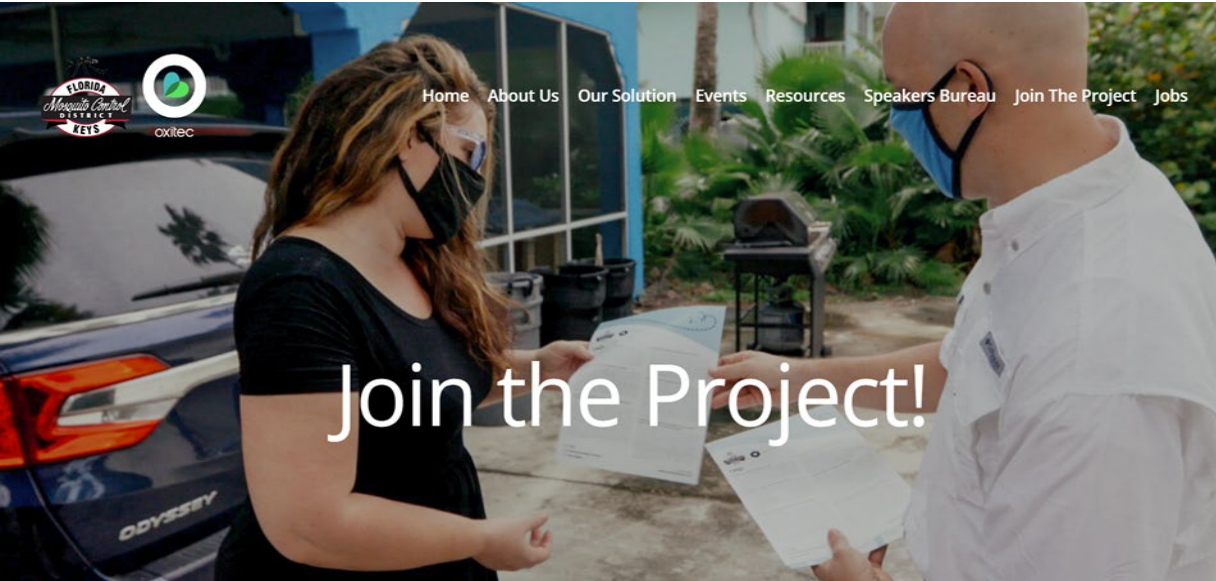
George Fernandez
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Community Engagement Continues

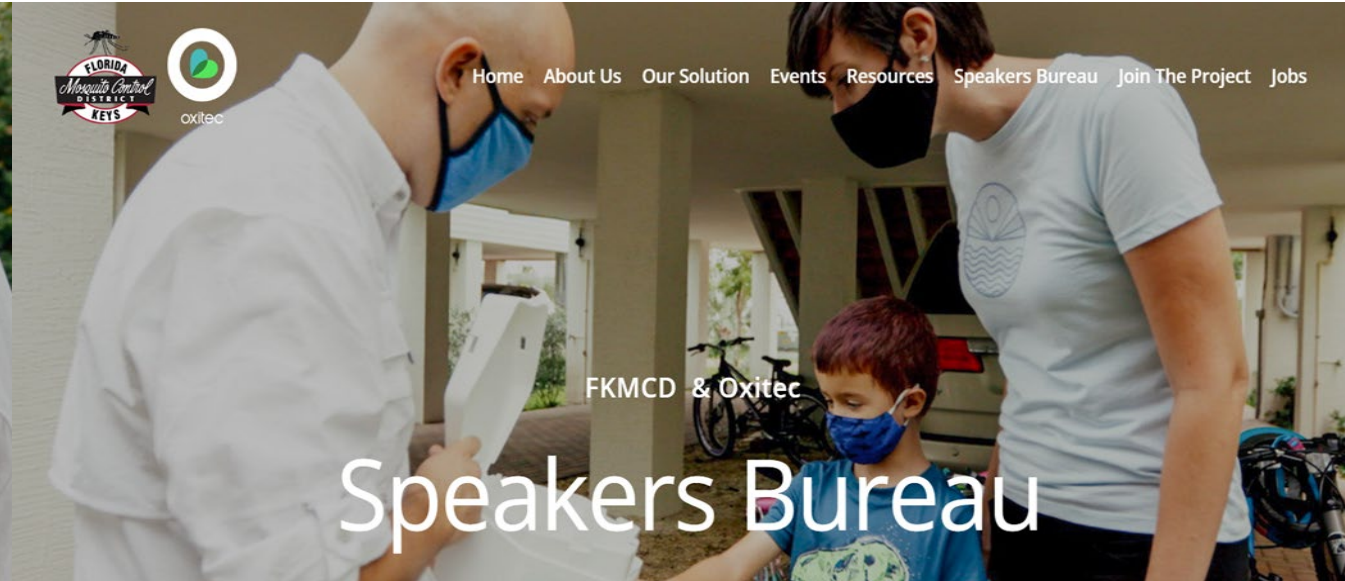


Media engagement; radio ads and interviews, social media, webinars, door-to-door, community events and festivals, project website, listserv, billboard, factsheets...and much more!

Get Involved!



- ✓ Request a box
- ✓ Request a trap
- ✓ Sign up for updates



This is available for free! We can customize our presentation for your audience and timing needs, arranged as either an in-person or virtual event. All presentations include speakers from FKMCD & Oxitec, as well as a Q&A session.

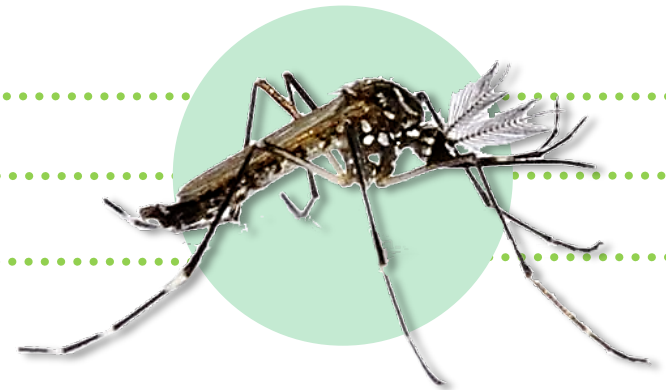
Oxitec's *Aedes aegypti* Male Mosquitoes

Oxitec male mosquitoes mate with invasive female pests, and only the male offspring of these encounters survive

✓ TARGETED SUPPRESSION

✓ SAFE, NON-TOXIC, NON-ALLERGENIC

✓ PROVEN EFFECTIVE



MALE-ONLY RELEASES ✓
(male mosquitoes do not bite!)

TRACEABLE IN THE FIELD ✓

SELF-LIMITING IN THE ENVIRONMENT ✓

2022 Field Project Designs and Data Collection



Regulatory Pilots

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

2022 Pilot Project Design and Aims

Project Design Elements

1. Single-point release, trapping males and offspring.
2. Multi-point release, trapping males and offspring.
3. Replicated and compared to untreated areas.
4. Locations determined post-community engagement.
5. Trapping to target both adult and immature stages.
6. Distance constraints relating to sewage treatment plants and citrus orchards.

Evaluation Elements

1. Numbers of male mosquitoes released.
2. Percentage kill of female mosquitoes sampled.
3. Proportion of the invasive population treated.
4. Dispersal and lifespan of released male mosquitoes.
5. Evaluation of natural breeding sites.
6. Duration of effect (residual activity).



Where and When Did Releases Occur?

Releases occurred in select locations in the Middle and Lower Keys

LOCATIONS:

- Release areas: Vaca Key; Ramrod Key; Fat Deer Key; Coco Plum; Grassy Key
- Untreated control sites were in Key Colony Beach, Vaca Key, Conch Key, and Duck Key.
- Releases began May 2022 and concluded November 2022.
- The project experienced one interruption from Tropical Storm Ian in late September.



How We Collected Data



Small plastic cups as "oviposition traps."

- These allow us to monitor the eggs laid by *Ae. aegypti* females.
- We monitor natural breeding sites too.



Standard mosquito traps to collect adults

- We also monitor ratios and numbers of *Ae. aegypti* adults.
- This helps us monitor biology and behavior.



Microscopes to identify larvae and insects

- We accurately separate *Ae. aegypti* from other species.
- Used to track field performance and confirm quality.

Mark-Release-Recapture

PURPOSE

- To determine OX5034 adult male longevity and flight range.

STUDY DESIGN

- Powder-marked OX5034 males released at once from a single point. Daily collections from adult traps identified powder marked adults showing where they dispersed to and when.
- Completed three times.



Success: Florida Keys 2022 Hits the Mark!



Key Outcomes

- ✓ **No females released:** Oxitec's self-limiting gene maintained effectiveness.
- ✓ **Dose rates were suitable for use:** Male release rates established effective male: male ratios and mating.
- ✓ **Oxitec males performed excellently:** Oxitec males dispersed and mated successfully and Oxitec progeny accessed cryptic breeding sites (this is good!).

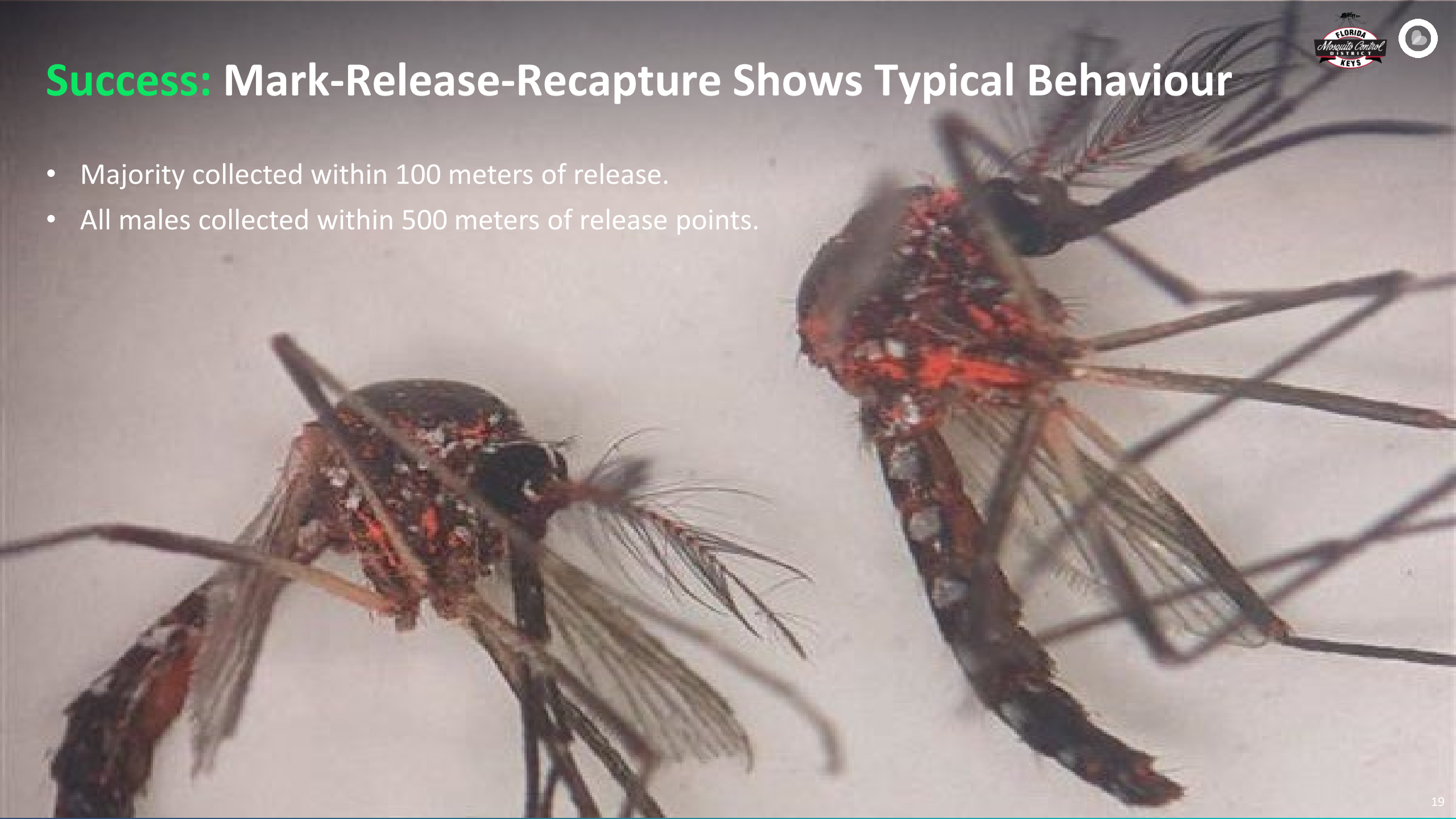
Success: Effective Mating and 100% Larvicidal Efficacy



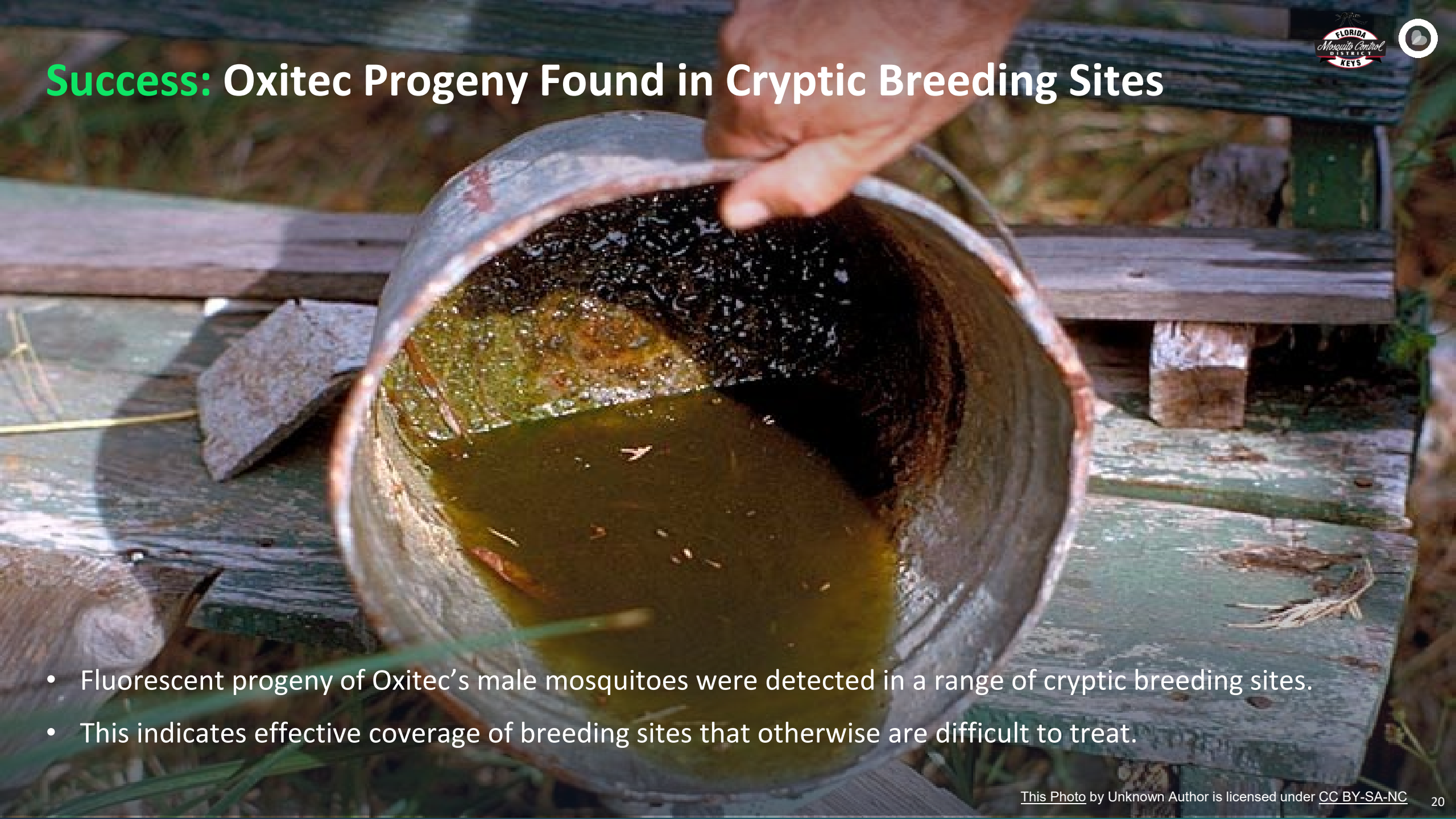
- Larvicidal efficacy of Oxitec mosquitoes = 100% throughout the project.
- All female offspring of our males died.
- The results are consistent with previous laboratory and field data from Oxitec pilots in the US and Brazil.

Success: Mark-Release-Recapture Shows Typical Behaviour

- Majority collected within 100 meters of release.
- All males collected within 500 meters of release points.



Success: Oxitec Progeny Found in Cryptic Breeding Sites



- Fluorescent progeny of Oxitec's male mosquitoes were detected in a range of cryptic breeding sites.
- This indicates effective coverage of breeding sites that otherwise are difficult to treat.

Success: Residual Activity and Post-Release Monitoring

- Following releases, each site is monitored to demonstrate any ongoing effects and show that Oxitec males disappear from the environment.
- This was completed as planned and post-release monitoring is now concluded.

2023 Project Plans



Preparing for 2023 Releases

Follow-up Oxitec mosquito releases in the Florida Keys in 2023

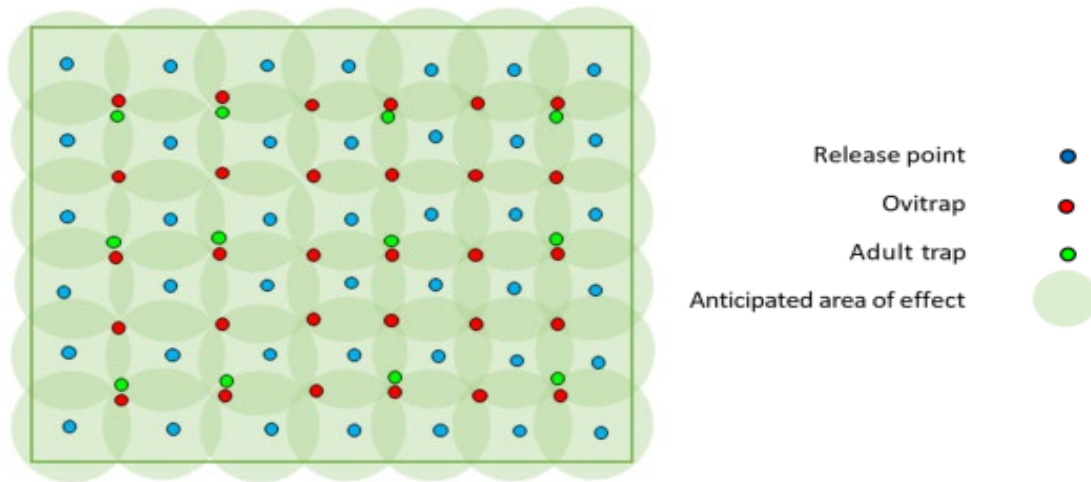
AIMS OF THE PROGRAM

- Demonstrate **strong performance of Oxitec males**.
- Supplement existing data on mosquito **dispersal, longevity** and **mating performance** including for small areas/single properties.
- Collect data relevant to support a **product registration**, which would facilitate Oxitec males for mosquito control more broadly in the USA.

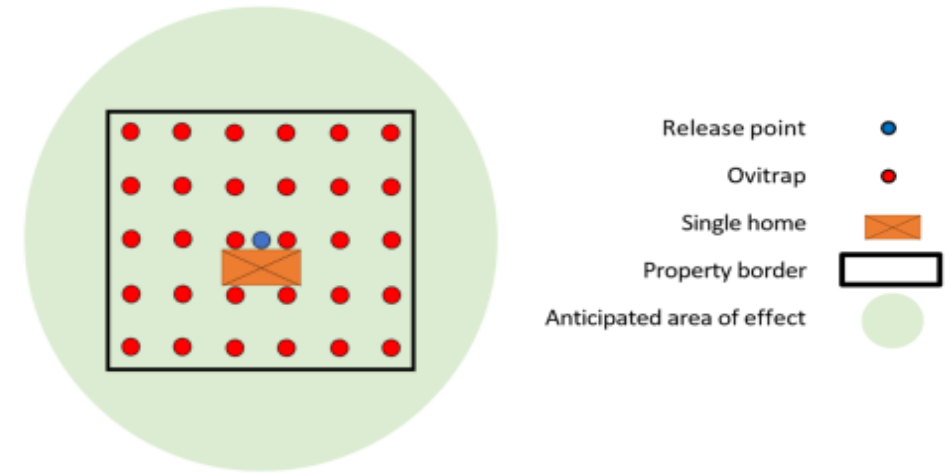


Two Field Trial Designs for Florida 2023

Project 'B' – Neighborhood Scale



Project 'D' – Household Scale



Both Projects B and D will evaluate important biological and performance related parameters:

- Performance of the self-limiting gene.
- Adult sex ratios.
- Proportion of population treated.
- Duration and scale of residual activity.
- Presence in cryptic breeding sites.

2023 Next Steps

This project is scheduled to begin the release phase in April 2023.

- **Community engagement:** This is already ongoing in potential project sites.
- **Pre-release monitoring of *Aedes aegypti*:** Already underway in potential Project B sites and control sites.
- **Timing:** Project B releases are scheduled to begin in early April, with Project D releases shortly after.



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 summaries at oxitec.com/florida and keysmosquitoproject.com.

THANK YOU!

A summary of this event, as well as more Q&As, resources, facts, and background materials will be made available at oxitec.com/florida and keysmosquitoproject.com