University of Florida
Institute of Food & Agricultural Sciences
Florida Medical Entomology Laboratory

ABOUT US

WEB

Research

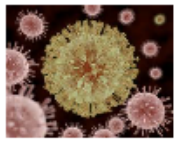
Teaching

Extension

Topics

Tracking down your mosquito problems

Clean up waterholding objects by dumping the water or removing the objects



Zika

Essential Information on the ZIKA Virus (Información sobre el Zika)

Risk Prediction from Chikungunya Virus

Emergence and Risk Prediction for Florida of Chikungunya Virus

Invasion Biology of Aedes albopictus

Invasion Biology of Aedes albopictus; Chikungunya Ecology in Americas

Container Mosquitoes

Ecology of Container Mosquitoes; Biological Control of Mosquitoes

Nutrition Ecology of FL Mosquitoes

Gonotrophic interactions; C. nigripalpus; A. aegypti

Marsh Management Strategies

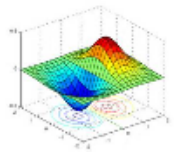
Marsh Management Strategies for Indian River Lagoon Marshes

Biological Control using Copopods

Biological Control of Mosquito Larvae using Copepods

Encephalitis Biology & Epidemiology

Population dynamics of mosquito vectors and avian amplification hosts



Simulations and Modelling

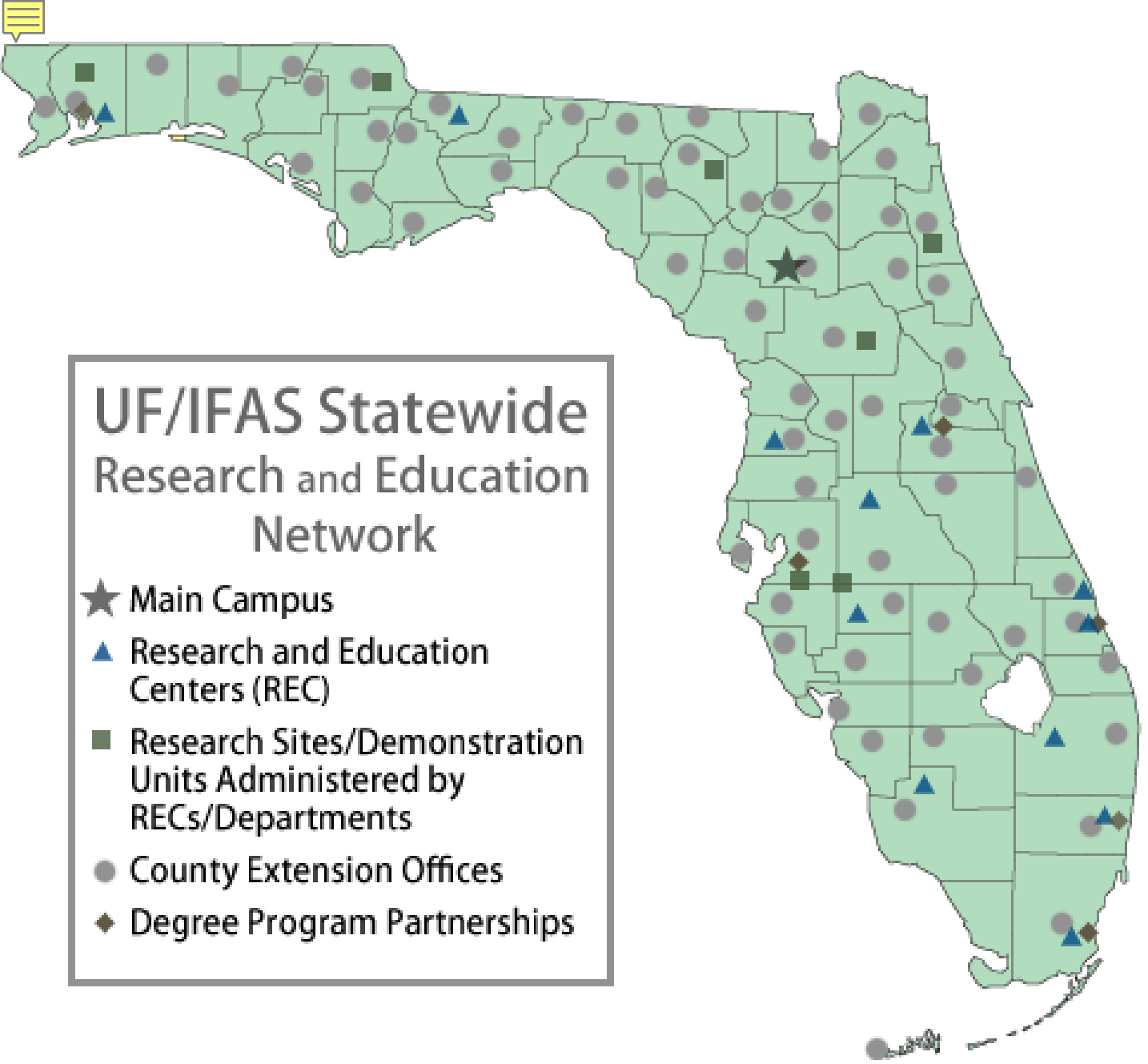
Population Dynamics & Epidemiological Modelling

Wastewater & Stormwater Mosquitoes

Stormwater Management Systems and Mosquito Production?

Mosquito Taxonomy & Identification

Essentials of good mosquito control is the proper Id of mosquito species



Mission of UF/IFAS

Develop knowledge in agricultural, human and natural resources and life sciences and to make that knowledge accessible to sustain and enhance the quality of human life

Extension Specialist

Dissemination of research-based information to stakeholders

- mosquito control programs
- county extension faculty
- general public

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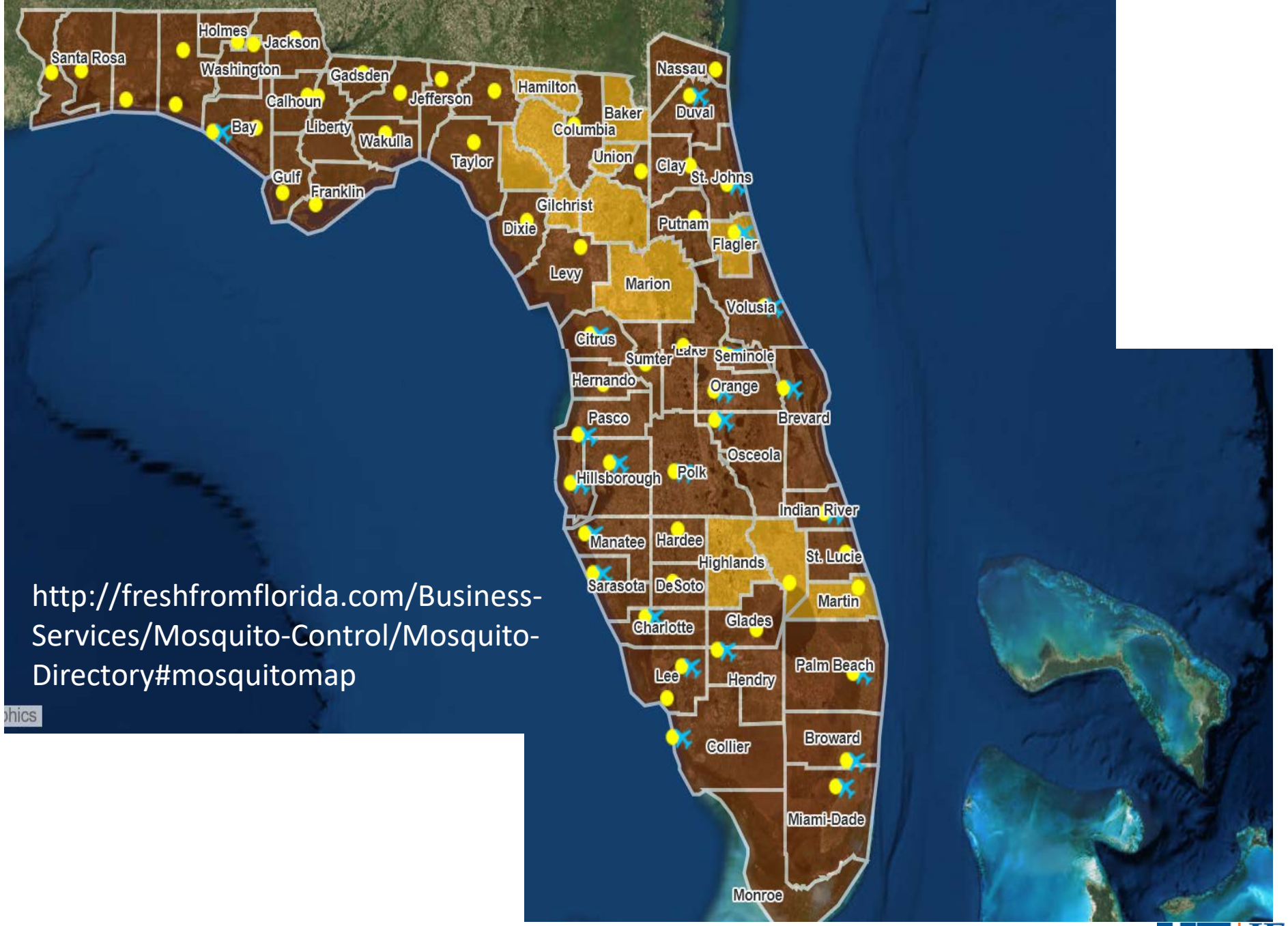

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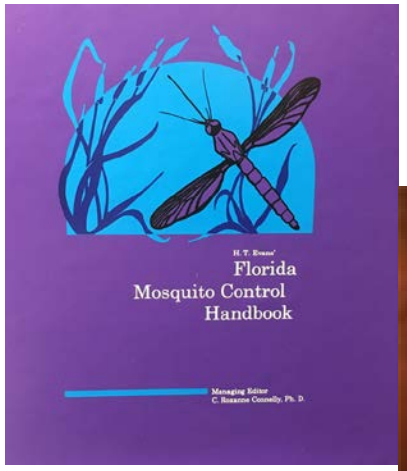
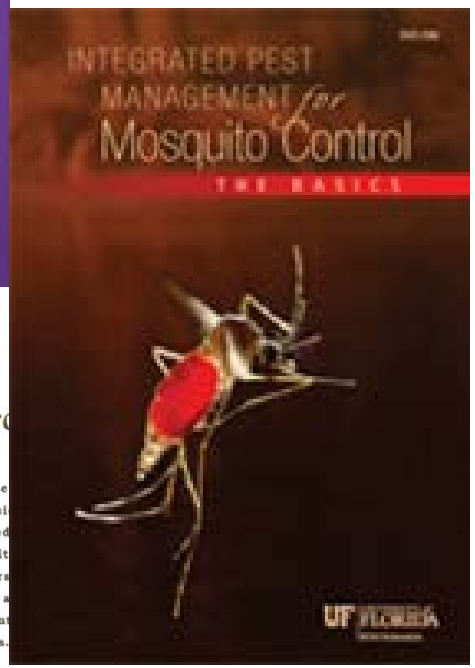
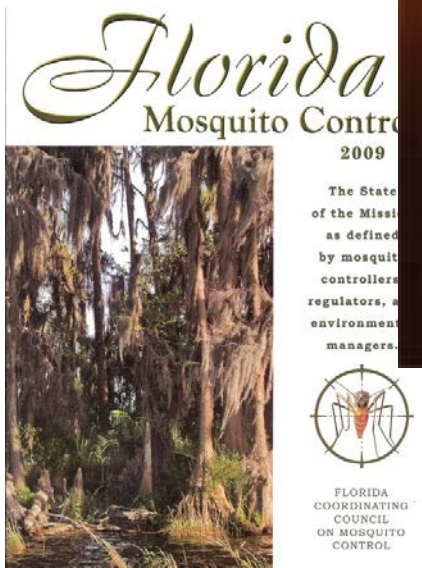
Guidance/assistance for surveillance and control of vectors of arboviruses to state and local health departments and mosquito control agencies







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ENY699

Surveillance for Mosquito-Borne Viruses[1]

C. Roxanne Connelly[2]

Mosquitoes and Disease Transmission in Florida

There are several mosquito-borne diseases that occur in Florida: Dengue, eastern equine encephalitis (EEE), St. Louis encephalitis (SLE), and West Nile (WN) fever/encephalitis; all of these diseases are caused by viruses that are transmitted by the bite of an infected mosquito.

mosquito-borne diseases and pest mosquitoes. In 2016, there were over 60 organized mosquito control districts in Florida. A very important component of any mosquito control program is surveillance.

An integrated surveillance program should monitor weather, mosquito abundance, host abundance, virus activity, human cases of mosquito-borne diseases, and other factors to detect or predict changes in the transmission

Florida HEALTH

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES EST. 1868

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ZIKA

A MOSQUITO-TRANSMITTED VIRUS

With focus on reducing mosquitoes and exposure to mosquito bites

Informational Webinar for
UF/IFAS Extension County Faculty

Wednesday, February 10, 2016
10:00AM Eastern Time
http://ufifas.adobeconnect.com/fmel/

PRESENTED BY

Dr. Roxanne Connelly
Extension Specialist, Medical Entomology
UF/IFAS Florida Medical Entomology Laboratory

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Zika Resources for Extension

Zika Resources for UF/IFAS Extension


Bromeliads and Mosquitoes


Zika in Florida


Container Mosquito Identification, Habitats, I


Zika Mosquito Materials for Youth


Mosquito-Borne Diseases of Concern

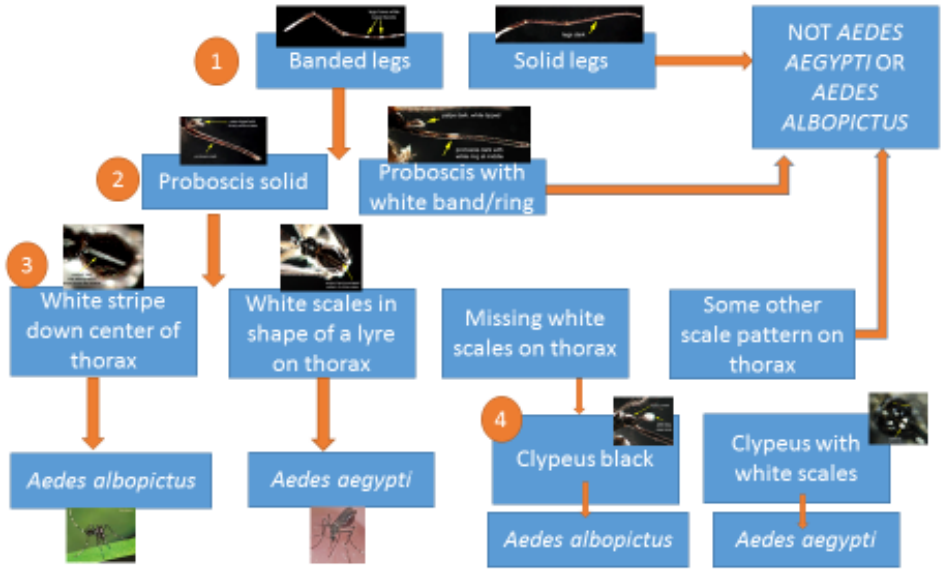

Repellents, Services, & Devices

Frequently Asked Questions


Additional Resources

C. R. Connelly 2016: UF/IFAS/FMEL

Sorting mosquitoes for identification of *Aedes aegypti* and *Aedes albopictus*



Mosquito Identification: County Extension Faculty

Devices and services

Hydroponic gardens

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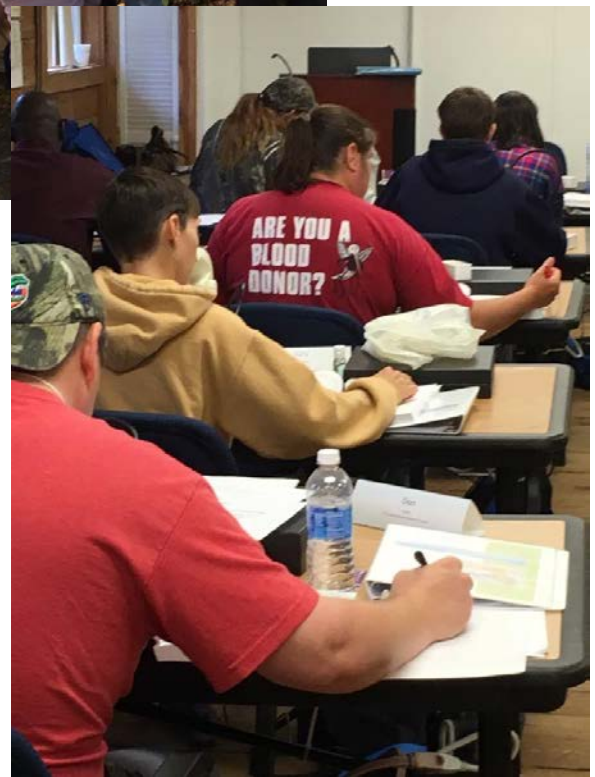
Advanced Mosquito Identification Certification



Advanced Mosquito Identification Certification

FDACS Employees
Mosquito Control Employees

CDC
Army, Navy, Air Force
Departments of Health
Universities
Mosquito Control
Industry (Clarke, VDCI)
Contractors
PAHO
Biosecurity New Zealand
USDA

Graduate and Undergraduate Credit

2000 – 2017: 400 certified

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Extension Disaster Education Network

EDEN's Zika team

- Dr. Roxanne Connelly, University of Florida - lead
- Dr. Kristen Bartlett-Healy, Louisiana State University AgCenter
- Elmer Gray, University of Georgia
- Dr. Jorge Rey, University of Florida
- Dr. Dan Suiter, University of Georgia
- Dr. Becky Trout Fryxell – University of Tennessee

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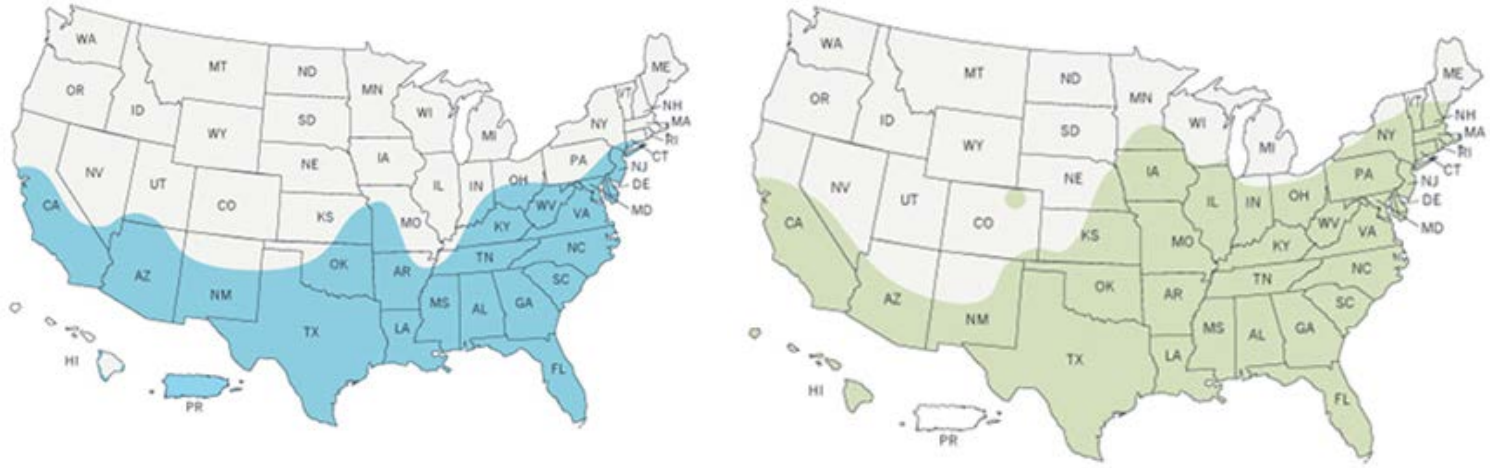
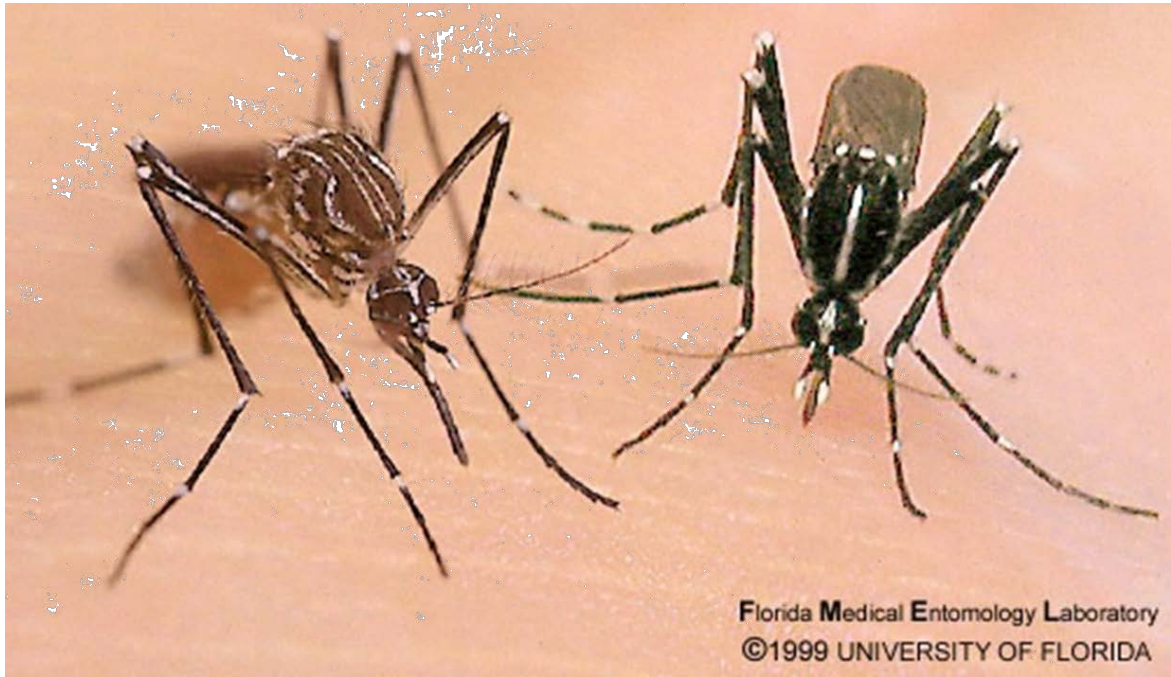
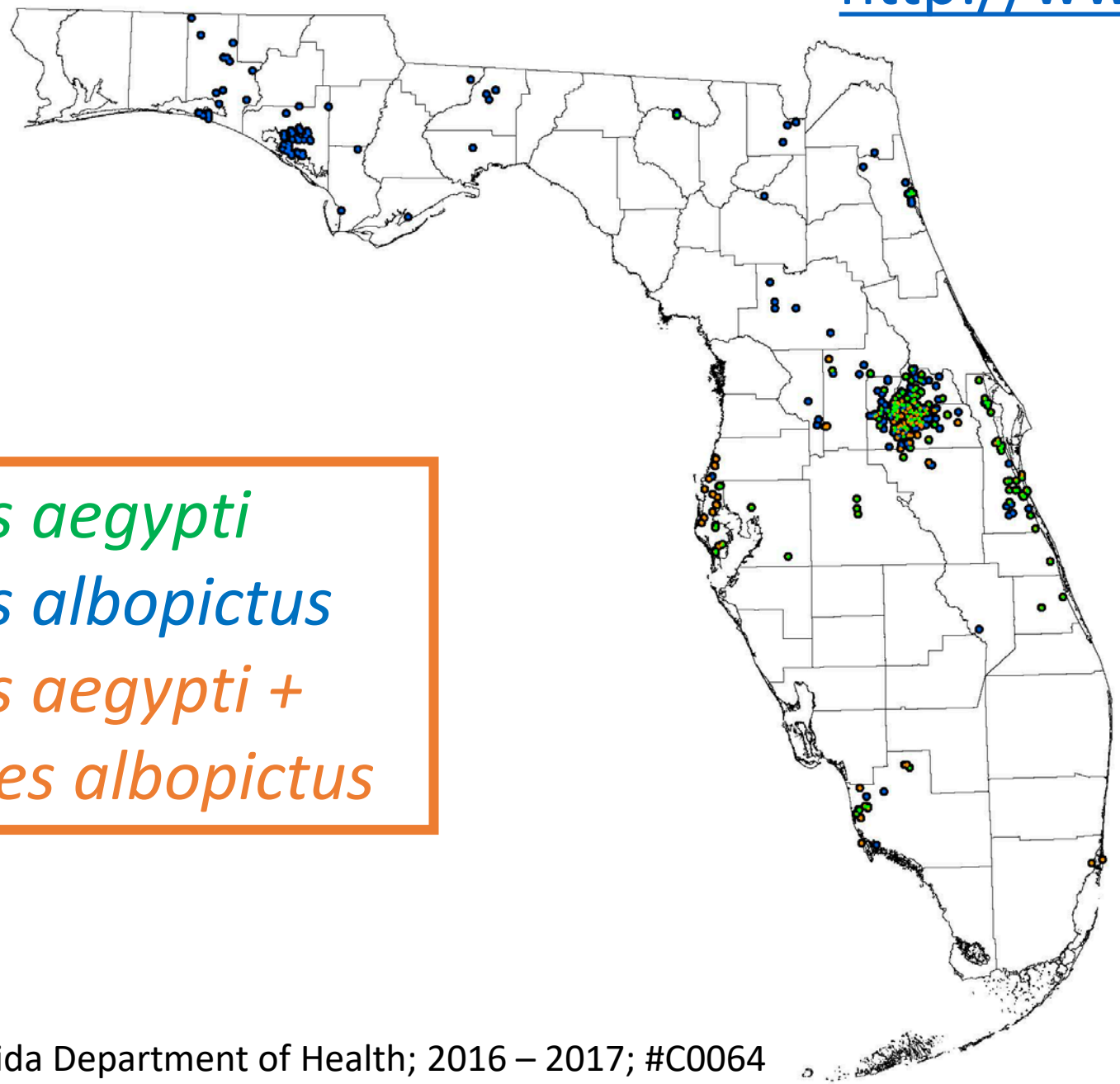
Update distribution information on *Aedes albopictus* and *Aedes aegypti* in Florida



Estimated range of *Aedes aegypti* (left) and *Aedes albopictus* (right)
http://www.cdc.gov/chikungunya/resources/vector-control.html



http://www.floridamosquito.info/



- *Aedes aegypti*
- *Aedes albopictus*
- *Aedes aegypti + Aedes albopictus*

Funded by Florida Department of Health; 2016 – 2017; #C0064

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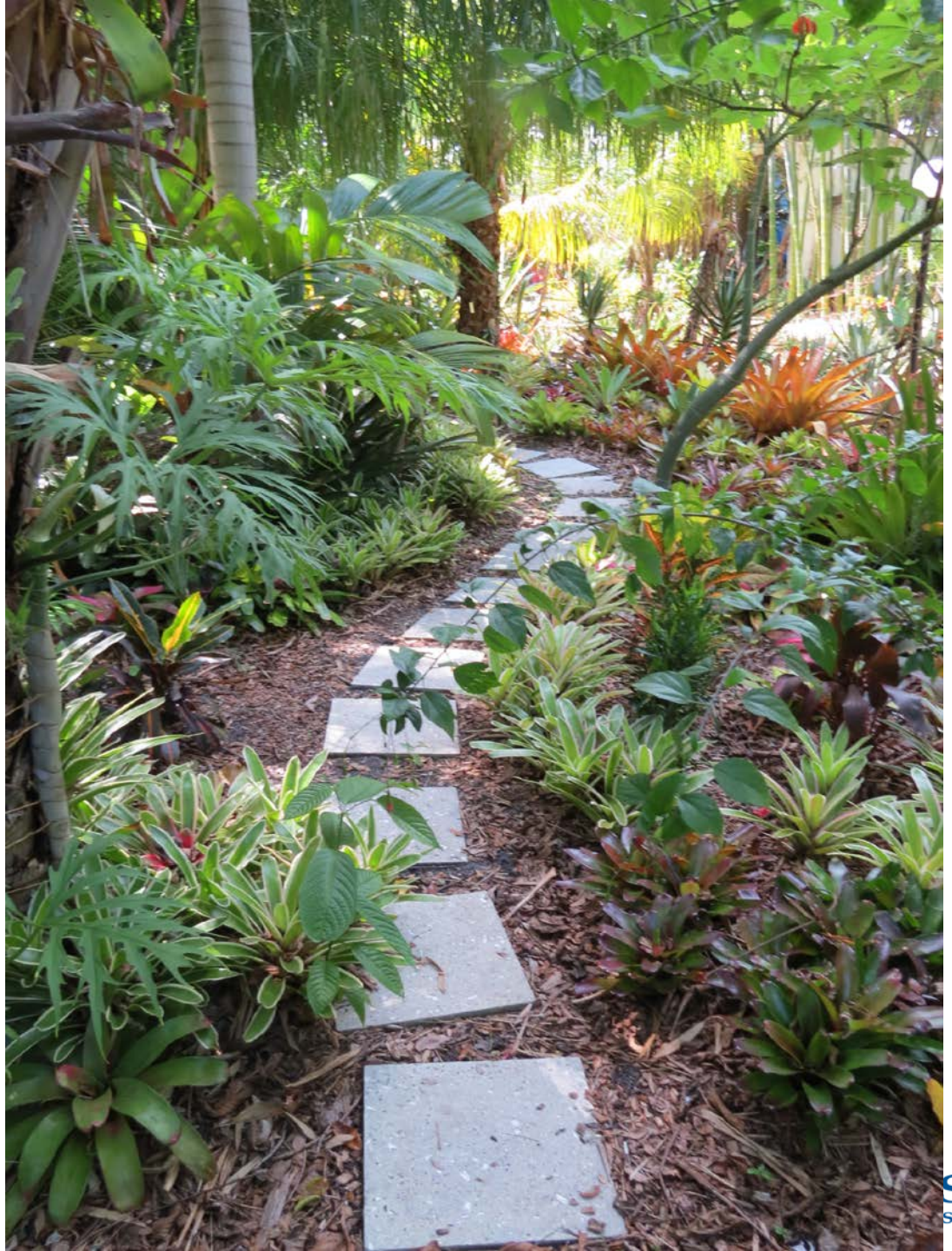

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Bromeliad-inhabiting mosquitoes at a Vero Beach residence

	Pre-treatment	Post-treatment
No. of *Neoregelia* plants sampled	40	40
No. of plants positive for mosquitoes	40	1
Overall species composition – No. larvae and pupae		
Wy. mitchellii	62	
Wy. vanduzeei	518	
Ae. albopictus	267	4
Ae. aegypti	104	
Cx. quinquefasciatus	681	
Total number of mosquitoes collected	1,632	4

FLORIDA

Bromeliad not to blame for Zika, say horrified fans of the flower

JENNIFER KAY
ASSOCIATED PRESS

MIAMI BEACH - Just over a month ago, Miami Beach Botanical Garden was home to over 2,000 colorful, water-trapping bromeliads, some featuring red flowers that burst like fireworks from dark green spirals. Identified as breeding grounds for mosquitoes that carry Zika, they've all been pulled out, leaving shallow depressions in flower beds and exposing irrigation lines.

Walking through the quiet haven in South Beach recently, Executive Director Sandy Shapiro pointed to where spiky yellow leaves once topped a block of stone at the entrance gate and where thick leaves with purple speckles would have served as camouflage for a 3-foot iguana sunbathing at the edge of a small pool. Only mulch fills those spaces now.

"It's been disastrous," Shapiro said at a meeting she hosted Sept. 20 to calm gardeners and growers angry about recommendations to uproot bromeliads to stop the spread of Zika.

Officials pulled all bromeliads from the 2.6-acre garden in South Beach, as well as from medians and parks, in Au-

AP

In this Sept. 21 photo, vacant areas of dirt sit at the entrance to the Miami Beach Botanical Garden, in Miami Beach, where bromeliads used to sit.

BRIEFLY

FPL begins retrac threatening Keys

KEY WEST - F Light officials say saltwater plume f Point nuclear po threatening freshw the Florida Keys.

Senior Director opment Steve Scru the power plant wil from the Biscayne

The aquifer sup lons of drinking wa land chain. The C saltwater plume i from the Florida thority's well field

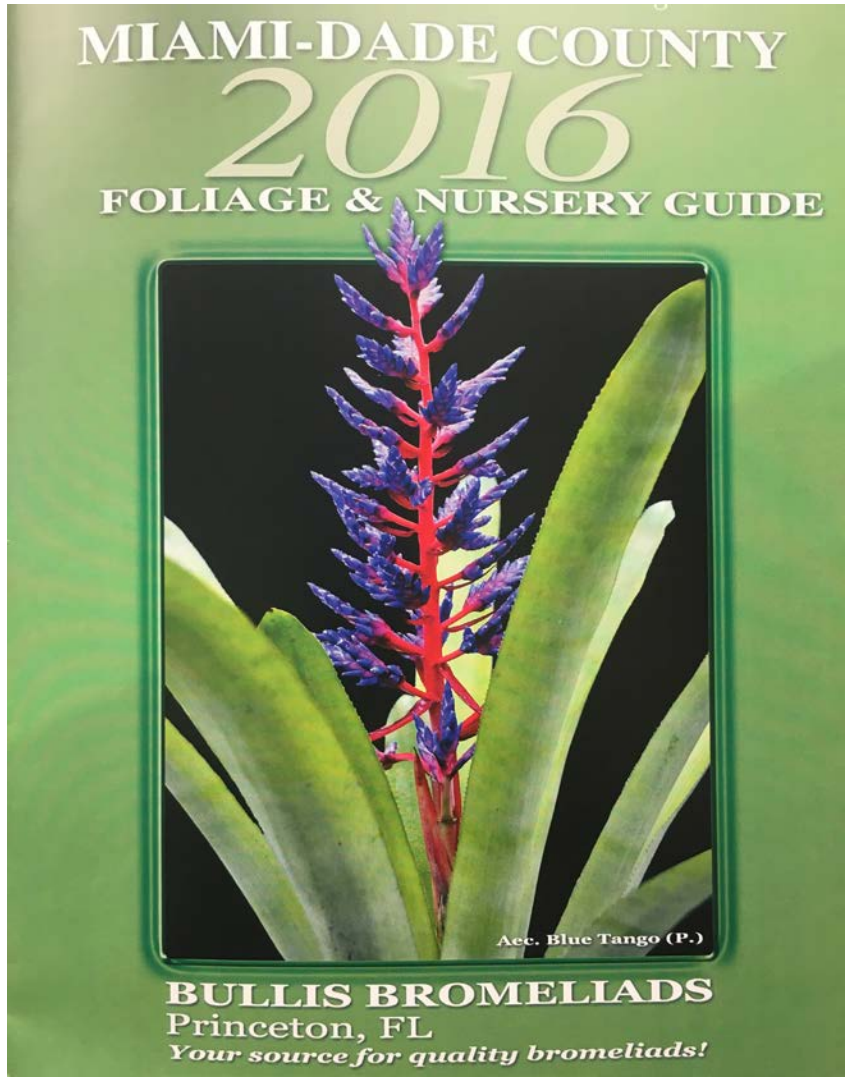
New photo exh aftermath of P

ORLANDO - exhibit looks at h er communities Pulse nightclub

The exhibit the Snap! galler features photog organizations in trons were murd club.

The 30 image tographers fr Press, Reuters New York Time

Florida sales of bromeliads for indoor and patio use totaled $38.8 million in the U.S. Department of Agriculture's 2014 Census of Horticultural Specialties. Bromeliad sales for outdoor landscaping add roughly $7.8 million more, according to Ben Bolusky, CEO of the Florida Nursey, Growers and Landscape Association.



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What can you do to prevent these mosquitoes from inhabiting your bromeliad plants?

There are several options:

- *Remove the plants* **(preferred);** or
- *Apply Mosquito Bits*® (a bacteria that is specific for killing mosquito larvae) every 7 days to the water-holding leaves of the plants. Follow the instructions on the package for the correct amount to apply; or
- *Apply Altosid Pro-G* (methoprene, an insect growth regulator) every 30 days to the water-holding leaves of the plants. Follow the instructions on the package for the correct amount to apply; or
- *Use water to flush out the mosquitoes that may be living in the water-holding leaves*. This must be done every 3—7 days to be effective. Make sure that the aquatic mosquitoes land in a dry area and that you are not just moving them from plant to plant. Removal of mosquito eggs from the plant leaves will require directed water pressure to dislodge and move them out of the plant into a dry area.

Bromeliad plants

Bromeliads and Mosquitoes

Mosquito larvae grow in the water-holding leaves of bromeliad plants. There are several types of mosquitoes that can be found in bromeliads in Florida. Their scientific names are *Aedes, Culex,* and *Wyeomyia.* The *Aedes* and the *Culex* are medically important because they can transmit viruses that cause Chikungunya, Dengue, West Nile, and Zika.

Take a look!

You can use a turkey baster to remove some of the water from the plants to look for larvae. Squirt the water into a container and look for small worm-like critters that are wiggling.

Water-holding leaves of bromeliads

Mosquito larvae

What can you do to prevent these mosquitoes from inhabiting your bromeliad plants?

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If left alone, the aquatic phase of the mosquito will end up as an adult mosquito that will be looking to feed on blood!

Adult female *Aedes aegypti*, mosquito associated with Zika, Dengue, and Chikungunya illnesses

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What can you do to prevent these container mosquitoes?

There are several simple options:

- *Apply Mosquito Bits®* (a bacteria that is specific for killing mosquito larvae) every 7 days to the water-holding leaf axils of the plants. Follow the instructions on the package for the correct amount to apply; or
- *Apply Altosid Pro-G* (methoprene, an insect growth regulator) every 30 days to the water-holding leaf axils of the plants. Follow the instructions on the package for the correct amount to apply; or
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- *Remove the water holding source*
- *For more information, visit* http://mosquito.ifas.ufl.edu


Bromeliad plants


Bird baths


Tires


Buckets


Dishes

Do you have mosquitoes in your yard?

Mosquito larvae grow in small water-holding containers, both natural and human-made, including items like plant saucers, buckets, used tired, bottles and cans, bird baths, tree holes, and the leaf axils of bromeliad plants. There are several types of mosquitoes that can be found in containers in Florida. Their scientific names are *Aedes, Culex*, and *Wyeomyia*. The *Aedes* and the *Culex* are medically important because they can transmit viruses that cause Chikungunya, Dengue, West Nile, and Zika.

Mosquito larvae

If left alone, the aquatic phase of the mosquito will end up as an adult mosquito that will be looking to feed!

Adult female *Aedes aegypti*, mosquito associated with Zika, Dengue, and Chikungunya illnesses

What can you do to prevent these container mosquitoes?

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Mosquitoes and Construction Sites

Disease-spreading mosquitoes can breed in nearly any container that holds water. This can include items around a construction site, such as water-filled jersey barriers, concrete floors, construction dumpsters, drums, five-gallon buckets, plastic litter, empty cans and bottles, plumbing and duct banks, elevator vaults and the like.

If you manage a construction site, here's how you can reduce mosquitoes at your site:

WATER-FILLED CONSTRUCTION BARRIERS

Water-filled construction barriers can breed mosquitoes. Even when empty, rainwater can enter through cracks or an open drain plug. Here's how to keep them from breeding mosquitoes:

- Treat them with a commercially available mosquito larvicide that contains Bti (Bacillus thuringiensis israelensis), methoprene, or larviciding oil.
- Cover and seal barriers properly, replace damaged barriers.

CONSTRUCTION DUMPSTER

Mosquitoes take about one week to go from egg to adult. Have your construction dumpster emptied at least once per week to break up the mosquito life cycle. Additionally, treat dumpsters with a commercially available larvicide (see above).

FIVE-GALLON BUCKETS, PLUMBING AND DUCT BANKS, AND OTHER SMALL CONTAINERS

Here's how to keep these items from breeding mosquitoes:

- Remove any unnecessary containers such as buckets; for containers you do need, either turn them upside down or store them where they can't fill up with rainwater.
- Discard or eliminate old bathtubs, sinks, toilets, or other plumbing fixtures. If you need to keep them onsite, cover them or store them where they can't fill up with rainwater.
- Keep building materials and supplies off the ground and positioned in such a way as to avoid creating areas of standing water and areas that are inaccessible for treatment.
- Seal duct banks and keep shower, spa, and pool areas free of water.

CANS, BOTTLES AND OTHER FOOD AND BEVERAGE CONTAINERS

Provide workers with a container or bag for proper disposal of cans, bottles and food or beverage containers when they're done. Mosquitoes can lay eggs in an item as small as a bottle cap from a water or soda bottle.

- Keep work areas in workmanlike order.
- Treat elevator vaults with a commercially available larvicide (see above).

PROTECT YOUR WORKERS FROM MOSQUITO BITES

Make sure workers wear long sleeves, long pants and socks, and put on mosquito repellent.

For more information on mosquito control in Miami-Dade County, call 311 or visit www.miamidade.gov/mosquito.

Do your part!
DRAIN&COVER

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Aedes aegypti - 2016

RESISTANT | DEVELOPING RESISTANCE | SUSCEPTIBLE

	Broward	Collier	FL KEYS	INDIAN RIVER	Miami Dade – Wynwood	Miami-Dade – Miami Beach	Orange	Pasco	Pinellas	St. Lucie
chlorpyrifos										
Deltamethrin										
Etofenprox										
Malathion										
Naled										
Permethrin										
Prallethrin										
Sumithrin (d-phenothrin)										
DeltaGard -										
Duet										
Permanone 30-30										

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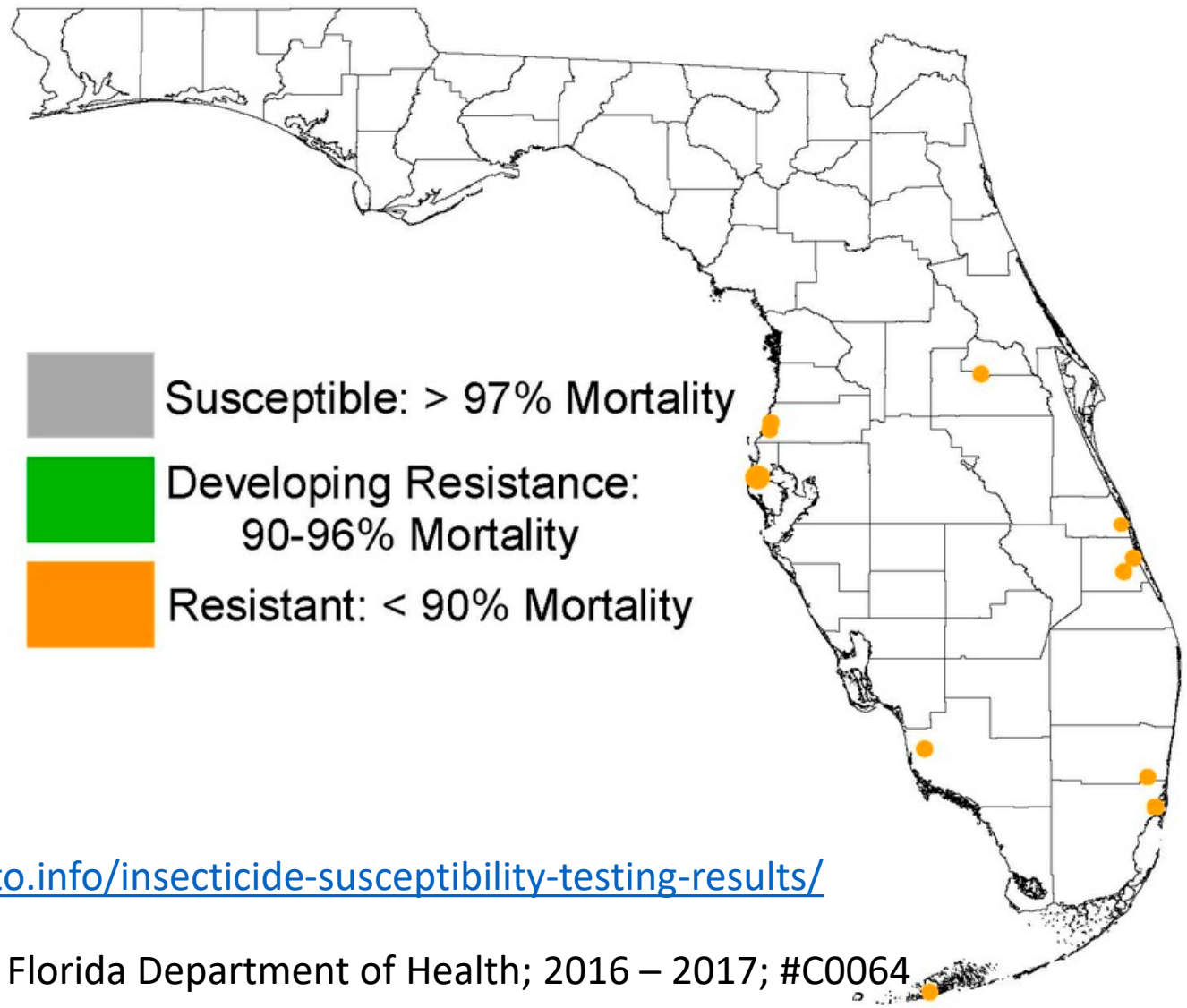
Species: *Aedes aegypti*
Active Ingredient: Permethrin



http://www.floridamosquito.info/insecticide-susceptibility-testing-results/

Funded by Florida Department of Health; 2016 – 2017; #C0064

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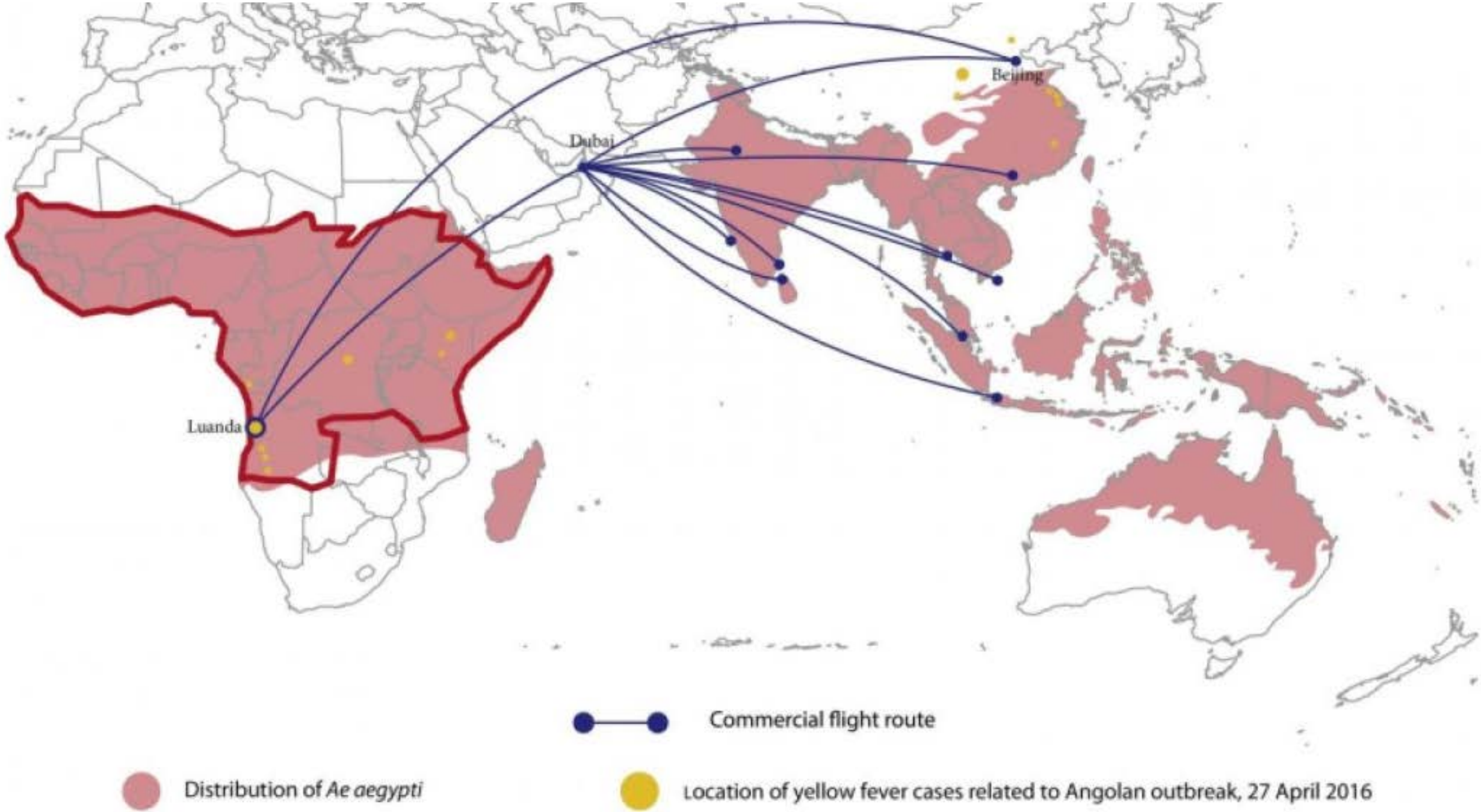
Where do we stand today?

- Mosquito control – different approach
- Likely to see local transmission again in 2017
- Awareness is high; but does that mean behavior change?
- Major vector is resistant to most commonly used insecticides approved for use in Florida

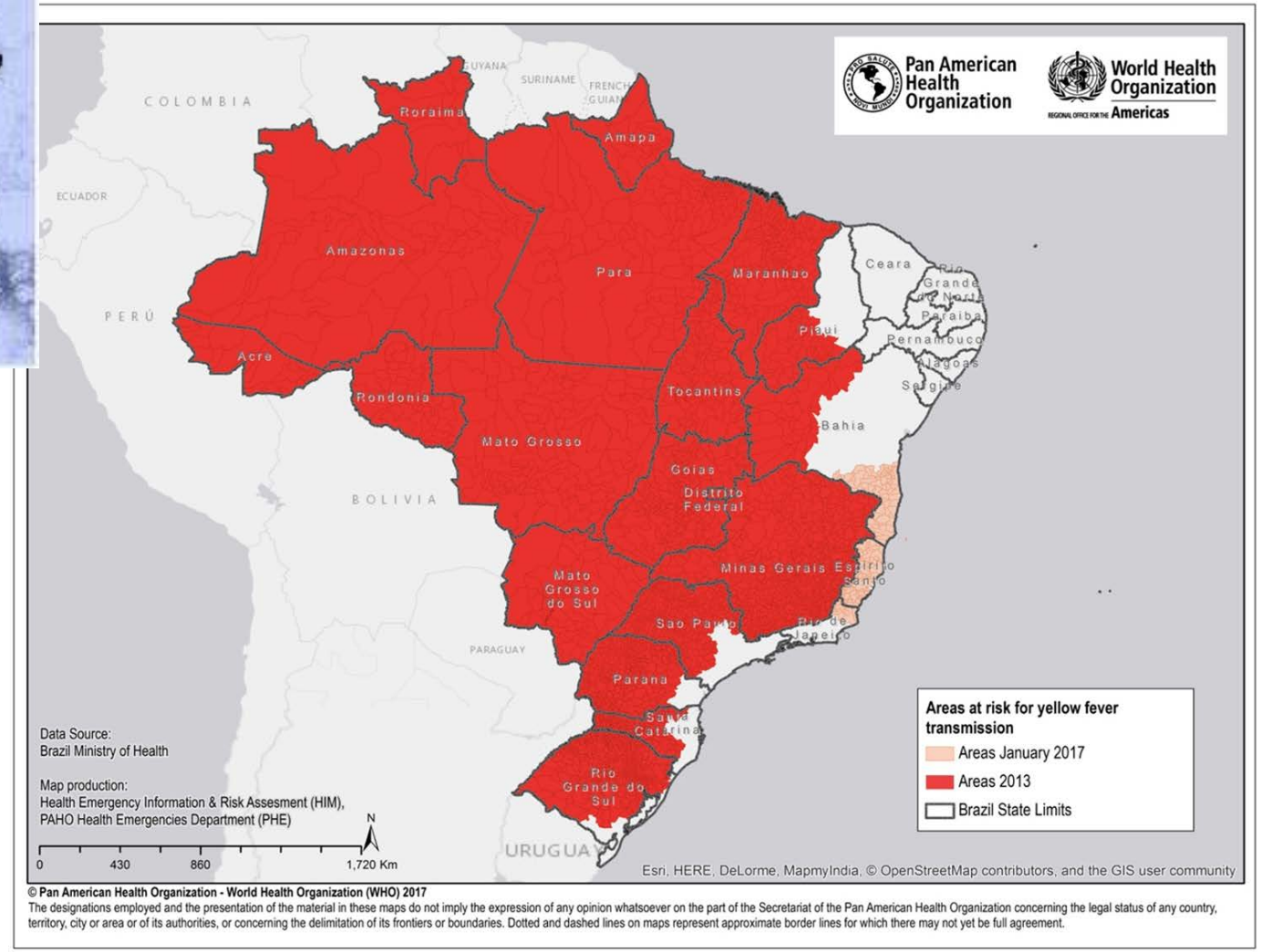
Where do we stand today?

- Everyone can help to increase awareness and promote behaviors to provide protection from mosquito bites:
  - Wear repellents
    - http://edis.ifas.ufl.edu/in419
  - Dump the water from containers; remove containers


Beijing
Dubai
Luanda
Commercial flight route
Distribution of *Ae aegypti*
Location of yellow fever cases related to Angolan outbreak, 27 April 2016

"In light of the serious nature of this historically devastating disease, public health awareness and preparedness, even for individual cases, are critical."

Dr. Anthony S. Fauci and Dr. Catharine Paules
National Institute of Allergy and Infectious Diseases



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