<table>
<thead>
<tr>
<th>Topics</th>
<th>Image</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Tracking down your mosquito problems</td>
<td><img src="mosquito_image.png" alt="Image of mosquitoes" /></td>
<td>Clean up waterholding objects by dumping the water or removing the objects</td>
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<tr>
<td>Zika</td>
<td><img src="zika_image.png" alt="Image of Zika virus" /></td>
<td>Essential Information on the ZIIA Virus (Información sobre el Zika)</td>
</tr>
<tr>
<td>Risk Prediction from Chikungunya Virus</td>
<td><img src="florida_map.png" alt="Image of Florida map" /></td>
<td>Emergence and Risk Prediction for Florida of Chikungunya Virus</td>
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<tr>
<td>Invasion Biology of Aedes albopictus</td>
<td><img src="aedes_image.png" alt="Image of Aedes albopictus" /></td>
<td>Invasion Biology of Aedes albopictus; Chikungunya Ecology in Americas</td>
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<tr>
<td>Container Mosquitoes</td>
<td><img src="container_mosquitoes.png" alt="Image of mosquitoes" /></td>
<td>Ecology of Container Mosquitoes; Biological Control of Mosquitoes</td>
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<tr>
<td>Nutrition Ecology of FL Mosquitoes</td>
<td><img src="nutrition_image.png" alt="Image of food" /></td>
<td>Gonotrophic interactions; C. nigripalpus; A. aegypti</td>
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<tr>
<td>Marsh Management Strategies</td>
<td><img src="marsh_image.png" alt="Image of marsh" /></td>
<td>Marsh Management Strategies for Indian River Lagoon Marshes</td>
</tr>
<tr>
<td>Biological Control using Copopods</td>
<td><img src="copepods_image.png" alt="Image of copepods" /></td>
<td>Biological Control of Mosquito Larvae using Copepods</td>
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<tr>
<td>Encephalitis Biology &amp; Epidemiology</td>
<td><img src="encephalitis_image.png" alt="Image of bird" /></td>
<td>Population dynamics of mosquito vectors and avian amplification hosts</td>
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<tr>
<td>Simulations and Modelling</td>
<td><img src="simulations_image.png" alt="Image of simulations" /></td>
<td>Population Dynamics &amp; Epidemiological Modelling</td>
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<tr>
<td>Wastewater &amp; Stormwater Mosquitoes</td>
<td><img src="wastewater_image.png" alt="Image of wastewater" /></td>
<td>Stormwater Management Systems and Mosquito Production?</td>
</tr>
<tr>
<td>Mosquito Taxonomy &amp; Identification</td>
<td><img src="mosquito_taxonomy.png" alt="Image of mosquito" /></td>
<td>Essentials of good mosquito control is the proper Id of mosquito species</td>
</tr>
</tbody>
</table>
Extension Specialist
Dissemination of research-based information to stakeholders
• mosquito control programs
• county extension faculty
  • general public

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

Surveillance for Mosquito-Borne Viruses
C. Roxanne Connelly

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
Zika Resources for Extension

Zika Resources for UF/IFAS Extension

- Bromeliads and Mosquitoes
- Zika in Florida
- Container Mosquito Identification, Habitats,
- Zika Mosquito Materials for Youth
- Mosquito-Borne Diseases of Concern
- Repellents, Services, & Devices
- Frequently Asked Questions
- Additional Resources

Informational Webinar for
UF/IFAS Extension County Faculty

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

Presented by
Dr. Roxanne Connelly
Extension Specialist, Medical Entomology
UF/IFAS Florida Medical Entomology Laboratory
Sorting mosquitoes for identification of *Aedes aegypti* and *Aedes albopictus*

1. Banded legs → Solid legs → **NOT Aedes Aegypti or Aedes Albopictus**
2. Proboscis solid → Proboscis with white band/ring
3. White stripe down center of thorax → White scales in shape of a lyre on thorax
4. Missing white scales on thorax → Some other scale pattern on thorax

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

**Mosquito Identification: County Extension Faculty**

**Devices and services**

*UF IFAS Extension UNIVERSITY of FLORIDA*
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
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
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
- *Aedes aegypti*
- *Aedes albopictus*
- *Aedes aegypti* + *Aedes albopictus*

[http://www.floridamosquito.info/](http://www.floridamosquito.info/)

Funded by Florida Department of Health; 2016 – 2017; #C0064
Bromeliad-inhabiting mosquitoes at a Vero Beach residence

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
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<tbody>
<tr>
<td>No. of <em>Neoregelia</em> plants sampled</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>No. of plants positive for mosquitoes</td>
<td>40</td>
<td>1</td>
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</table>

Overall species composition – No. larvae and pupae

<table>
<thead>
<tr>
<th>Species</th>
<th>Number</th>
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<tbody>
<tr>
<td><em>Wy. mitchelli</em></td>
<td>62</td>
</tr>
<tr>
<td><em>Wy. vanduzeei</em></td>
<td>518</td>
</tr>
<tr>
<td><em>Ae. albopictus</em></td>
<td>267</td>
</tr>
<tr>
<td><em>Ae. aegypti</em></td>
<td>104</td>
</tr>
<tr>
<td><em>Cx. quinquefasciatus</em></td>
<td>681</td>
</tr>
</tbody>
</table>

Total number of mosquitoes collected 1,632 4
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 deep green urns. 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 poked a thumb 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 mud fills these spaces now.

“It’s been disastrous,” Shapiro said at a meeting she hosted Sept. 26 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-

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 added roughly $7.8 million more, according to Ben Bolusky, CEO of the Florida Nursery, Growers and Landscape Association.

BRIEFLY

MIAMI-DADE COUNTY
FOLIAGE & NURSERY GUIDE

Bullis Bromeliads
Princeton, FL
Your source for quality bromeliads!
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.
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

- **Use water to flush out the mosquitoes that may be living in the water-holding leaf axils.** 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; or

- **Remove the water holding source**

- **For more information, visit** [http://mosquito.ifas.ufl.edu](http://mosquito.ifas.ufl.edu)
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 on-site, 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, click here.

Don’t let your construction zone become a mosquito zone.

If you partake:
- **Drain**
- **Cover**

For more information on mosquito control in Miami-Dade County, call 311 or visit www.miamidade.gov/mosquito.
# Aedes aegypti - 2016

<table>
<thead>
<tr>
<th></th>
<th>Broward</th>
<th>Collier</th>
<th>FL KEYS</th>
<th>INDIAN RIVER</th>
<th>Miami Dade - Wynwood</th>
<th>Miami-Dade - Miami Beach</th>
<th>Orange</th>
<th>Pasco</th>
<th>Pinellas</th>
<th>St. Lucie</th>
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<td>chlorpyrifos</td>
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<td>Permethrin</td>
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<td>Prallethrin</td>
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<td>Sumithrin (d-phenothrin)</td>
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<td>DeltaGard - Duet</td>
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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
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](http://edis.ifas.ufl.edu/in419)
  • Dump the water from containers; remove containers
“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
Dr. Roxanne Connelly
UF/IFAS/Florida Medical
Entomology Laboratory
crr@ufl.edu