

Guidance for Zika Vector Surveillance, Control, and Public Education

Adriane Rogers

Medical Entomologist

Special Projects Section

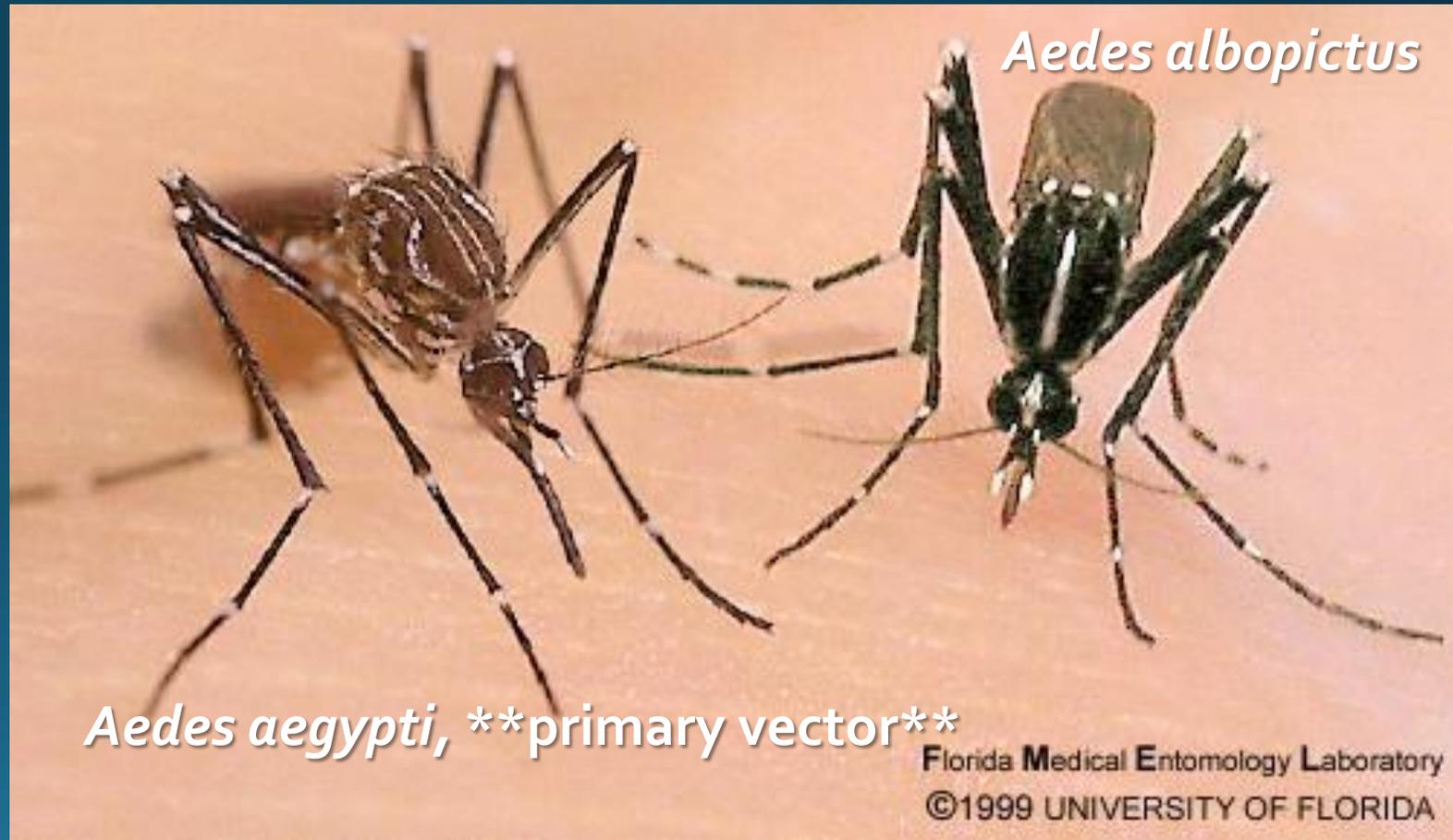
Bureau of Scientific Evaluation and Technical Assistance

Division of Agricultural Environmental Services



ZikV Transmission

- Primarily through bite of infected mosquito
- 2 competent vectors
 - *Aedes aegypti* **
 - *Aedes albopictus*



Aedes aegypti

- Yellow Fever Mosquito
 - Invasive species
 - Likely originated in Africa
 - Present in New World for several hundred years
 - Inhabits tropical and subtropical environments
 - Present in at least half a dozen states in US



UF/IFAS



Aedes albopictus

- Asian Tiger Mosquito
 - Invasive species originated in Asia
 - Present in the New World for ~30 years
 - Spread globally primarily through international trade in used tires
 - Adept at persisting in more temperate climates



Approximate US Distribution

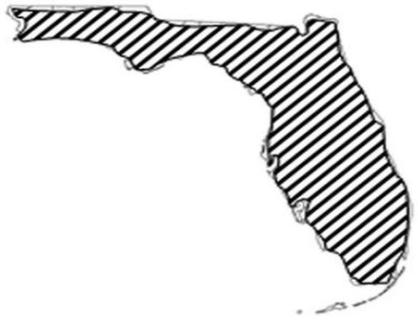


 *Aedes aegypti*



 *Aedes albopictus*

Approximate Florida Distribution



Ae. aegypti
distribution prior
to the arrival of
Ae. albopictus



Rapid progression of *Ae. albopictus* invasion



1986



1989



1991

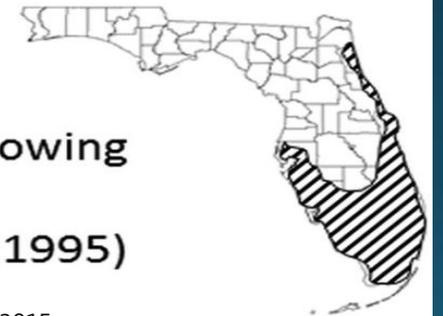


1994

****Distribution in Florida has not been updated
since 1995!****



Ae. aegypti
distribution following
Ae. albopictus
establishment (1995)



Domestic Preference

- Live in urban areas around human habitation
- Utilize natural and man-made containers for oviposition
 - Preference for cryptic habitats makes control difficult



Domestic Preference

- Day time biters
 - Prefer human hosts
- Short flight range
 - Only travel ~150 m from eclosion site
 - Driven by availability of oviposition sites



Domestic Preference



CDC Guidance on Zika Vector Control

- www.CDC.gov
- Many MCPs in FL already doing this!!
- Purpose of today's workshop to address challenges and needs to conduct Zika vector control

Best Management Practices

- Controlling domestic species requires fully comprehensive *Integrated Mosquito Management* regime
 - Public education
 - Source reduction
 - Larviciding
 - Targeted adulticiding
 - Surveillance



Proactive Approach

- Link vector control efforts with communication efforts
 - Ensure public education campaigns include information not just on personal protection measures but *source reduction* as well
- Actively engage community
 - Encourage and motivate citizens to remove/dispose of water holding containers
 - Organize community cleanup campaigns
 - Tire removal, trash pickup, removal and cleaning of containers
- Leverage partnerships with other local governments and non-profits for support



Educational Campaign



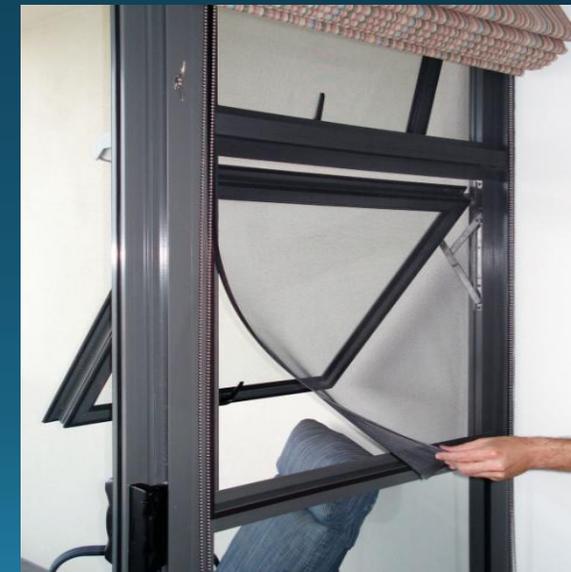
- **Message:**

- **Eliminate water holding containers around your home**
 - Drain, discard, or destroy containers
 - Clean gutters
 - Flush bromeliads and bird baths out every 3-5 days
 - Stock ponds w/ fish and keep pump running



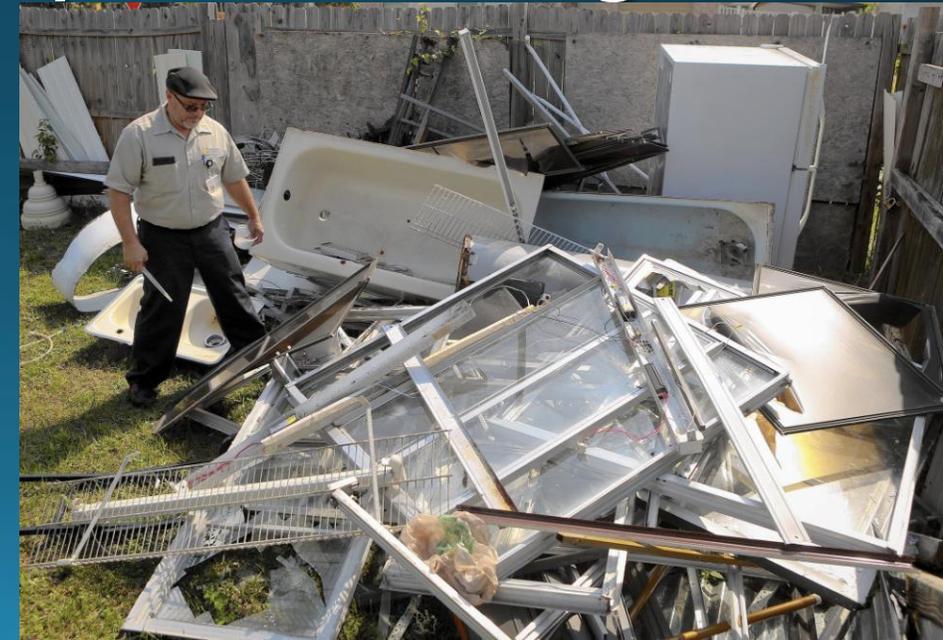
Educational Campaign

- Keep mosquitoes outside
 - Use screens on all windows/doors
 - Repair holes in screens
 - Use air conditioning
- Wear protective clothing
- Use insect repellent in accordance with label



Source Reduction

- Initiate community-wide surveys/door-to-door inspections
 - Focus on elimination or removal of mosquito breeding habitats and educating homeowners
- Incredibly labor intensive but must be done to disrupt life cycle
- **Larvicide** containers you cannot render incapable of holding water



Adult Mosquito Control

- During outbreak, adult control crucial
 - Immediately reduce abundance of biting, potentially infected adults
- *Aedes aegypti* known to have resistance to some pyrethroids in certain locations in FL
 - Adulticide choices should be preceded by assessment of possible resistance to products chosen
- Targeted residual spraying/barrier application
 - Treatment of vegetation, etc. likely to serve as adult mosquito resting sites
 - Use hand-held/backpack devices at target site and 150 yard radius around site

Adult Mosquito Control

- **Space spraying – targeted or widespread**
 - **Recommended for immediate knockdown**
 - If adult mosquito populations very high or more widespread local transmission recognized
 - **Use hand-held application devices to provide targeted applications to site and 150 yard radius around site**
 - **Treatment of larger areas require truck-mounted sprayers or aircraft**
 - **Truck-based applications may reach larger areas**
 - However leave gaps in coverage due to limitations of road infrastructure and affinity of domestic species to rest in sheltered areas around the home
- ***Be conscious of hobby bee keepers (day time applications)**

Integrated Mosquito Control

- **First human case of Zika**
 - Control efforts must be quickly/aggressively amplified to prevent widespread outbreak
 - Conduct intensified larval and adult control in a 150 yard radius around case patient home
 - **Targeted control** activities involving **Door-to-door sweeps** should be closely coordinated with concurrent **educational efforts and messaging**

Integrated Mosquito Control

- **Widespread transmission within a county/jurisdiction**
 - Further intensify and expand control efforts within area(s) of active transmission
 - Area-wide treatments with larvicides and adulticides using truck and/or aerial applications should be considered
- Monitor effectiveness of treatments through trapping and retreat if mosquito numbers increase

Adult Mosquito Surveillance

- Monitor adult abundance and identify areas where control measures needed
- Make it routine with a series of collecting sites sampled regularly (weekly)
 - Fixed trap sites allow monitoring of trends in abundance over time
 - Essential for obtaining information to guide control efforts (base line)
- Recommended to add additional trap sites as necessary around virus cases under disease situations
- Trap placement is key for collecting domestic species!
 - Densely populated urban areas, tire piles, cemeteries

Adult Surveillance

- **BG Sentinel Trap for adult collections**
 - Excellent surveillance tool for domestic species
 - Mimics human body convection currents
 - Releases artificial human skin and octenol lures through large surface area
 - Utilizes attractive visual cues
- ****Catches increased with CO₂**



Adult Surveillance

- Interest in gathering data on current geographic distribution of *Aedes aegypti* and *Aedes albopictus*
 - Accurate distribution data critical
 - Predict outbreak occurrences
 - Identify areas requiring treatment to prevent outbreaks
 - Evaluate response readiness

Proposal for update on container mosquito distribution and insecticide resistance in Florida

- FMEL requested funds to begin work this summer
 - FDACS working with FDOH to procure funding
- Update distribution information on *Aedes aegypti* and *albopictus* in FL
- Conduct statewide insecticide resistance monitoring program
- Data from both components of the project will be shared with participating agencies via password protected website in close to real-time

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

- Eggs, larvae/pupae, and adult collections
 - Ovicups and egg papers for eggs
 - Sampling of containers for larvae and pupae
 - BG Sentinel traps for adults
- Ask for data from MCDs who are already doing the work
- FMEL Team will travel statewide to collect immatures in tire yards, cemeteries, and other sources

Statewide insecticide resistance monitoring program for *Aedes albopictus* and *Aedes aegypti*

- Eggs will be collected and shipped to FMEL
 - Recruit MCPs and County Extension offices to place egg cups and mail egg papers
- First round of testing will be on permethrin; other a.i. will be tested if enough mosquitoes are provided
- Questions? Contact Dr. Roxanne Connelly: crr@ufl.edu

Questions?

Adriane Rogers

Adriane.Rogers@FreshFromFlorida.com

850-617-7929

Medical Entomologist

Special Projects Section

Bureau of Scientific Evaluation and Technical Assistance

Division of Agricultural Environmental Services



Contact Us!

- Kelly.Friend@FreshFromFlorida.com
- Davis.Daiker@FreshFromFlorida.com
- Adriane.Rogers@FreshFromFlorida.com
- Shalom.Siebert@FreshFromFlorida.com

- Please submit funding requests to stateesf8.planning@flhealth.gov
 - Include line item budget and brief description
 - Copy your local county DoH