Mosquito Control Measures for *Aedes aegypti* and *Aedes albopictus*

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Mosquito Vectors

Aedes albopictus

Aedes aegypti
Aedes albopictus Behavior

- Primarily daytime biters
  - Feeds on humans as well as other mammals and birds
- Very aggressive
- Short flight range
- Eggs can overwinter
**Aedes aegypti Behavior**

- Primarily daytime biters
  - In Key West:
    - Peak activity was recorded between 8:00am-10:00am & 4:00pm-6:00pm
- "Stealth" biters
  - Not very aggressive
  - Ankle-biters
- Short flight range
Common Larval Habitats

• Domestic and Natural habitats
  • Anything that can hold a tablespoon of water
    • Plastic containers & bags
    • Plant trivets
    • Flower pots
    • Fountains
    • Garbage cans
    • Tires
    • Tree Holes
    • Rock Holes
Surveillance for *Aedes aegypti* & *Aedes albopictus*

- What we are used to…
Surveillance for *Aedes aegypti* & *Aedes albopictus*

- More precision...

[BG Sentinel Trap](#)

[Ovicup](#)
Surveillance for *Aedes aegypti*

- Larval surveillance
  - Labor intensive
  - House-to-house
    - House Index (% of homes positive)
    - Container Index (% of wet containers positive)
  - Easy way to explain to the public where the problem areas are located…
Advertisement in Local Paper

Percent of Homes with Dengue Fever Mosquito Larvae
Key West: July 12 - 18

*Experts say 2% or less could reduce dengue transmission. Please check your yard and eliminate any standing water.

Spray Schedule: www.keysmosquito.org
Epidemic Curve vs. House Index

Number of Cases

Week of Year

Percent of Properties with Ae. aegypti larvae

2010
2009
Avg House Index 2009-2010
Key West House Indices by Week: 2010-2013

% Larval Positive Inspections

3-Jan, 3-Mar, 3-May, 3-Jul, 3-Sep, 3-Nov

Key West *Aedes aegypti* Weekly Catch Rate: 2010-2013

![Graph showing weekly catch rate of *Aedes aegypti* in Key West from 2010 to 2013. The graph displays the number of *Aedes aegypti* per trap per night, with peaks and valleys throughout the year for each year.]
Control Methods: Larval Control

- House-to-house
  - Treating every container
    - Need access to all properties
  - Requires a lot of manpower
    - FKMCD dengue response:
      - 20-26 employees/day
      - 6 weeks to cover 3x5 area 3x’s
  - Public did not like weekly visits
House-to-House Larval Control

- Use residual products whenever possible
  - More time before return visit
- Be thorough
  - One container can affect the area
- Educate the homeowners
  - One-on-one chance to show homeowners how to take care of their own property to avoid mosquito production
Larval Control: ULV applications
Larval Control: ULV applications

- Advantages:
  - Broad-area covered in small amount of time
  - Target-specific products available
  - Greater public acceptability

- Disadvantages:
  - Cost
  - Timing: immediately before or after rain best
Truck and Aerial Spraying

- Little/no measurable results in traps
- Difficult to reach due to behavior
  - Key West: Many open houses
  - Timing of spray is critical
  - Difficult to perform day-time spraying due to public
Handheld ULV Applications

- Highly effective
- Time consuming
- Need a good number of:
  - People
  - Handheld units
- Need access to all homes
Thermal Fogging

- Smaller droplets
  - Stays elevated longer
- Cloud allows for better efficacy
  - See where it travels
  - Better coverage
- Weather is a big factor
  - Wind, temperature
- Access to all homes?
Barrier Treatments

- Good potential for important areas
  - Ports
  - Shared outdoor spaces
  - What are the main areas of introduction??
- Longer residual
- Vegetation for harborage
Domestic Mosquito Control

- Relatively difficult
- Varies by area
  - Human habits
  - Mosquito habits
- New methods on the horizon
  - Genetically modified mosquitoes
  - Wolbachia infested mosquitoes
  - Auto-dissemination traps
Adult *Aedes aegypti* & *Aedes albopictus* control

- Know your population
  - Many instances of resistance
    - Test your population often
  - Know their behavior
    - Key West is different
- Trial by error
  - Test new methods before deploying operationally
Acknowledgments

- FKMCD Staff
  - Inspectors
  - Catherine Pruszynski
  - Larry Hribar
  - Michael Doyle

- Valent BioSciences