



# **Mosquito Control Update**

Board of County Commissioners  
Work Session  
February 16, 2016

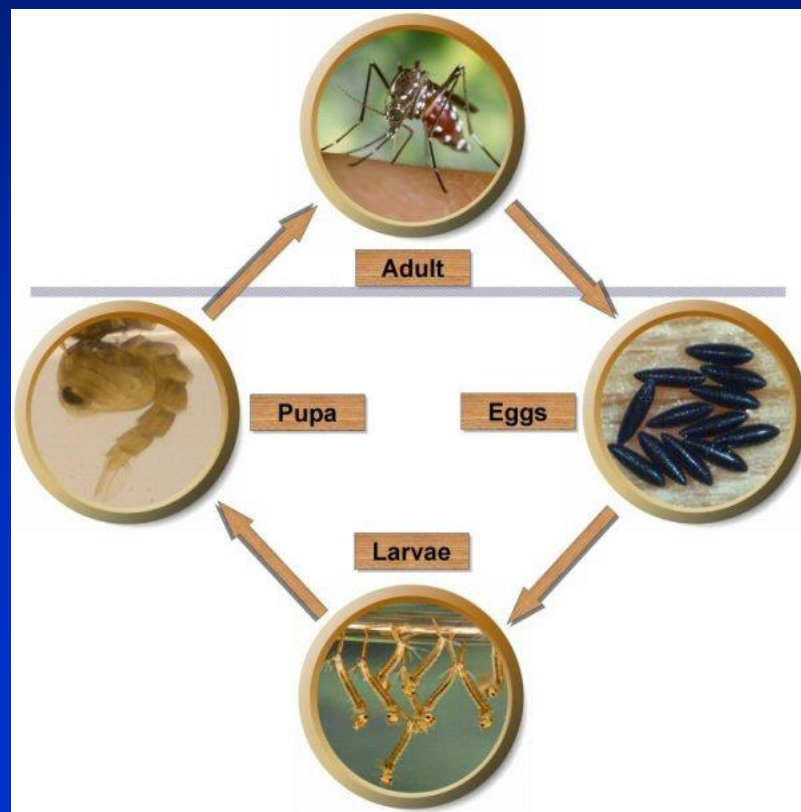
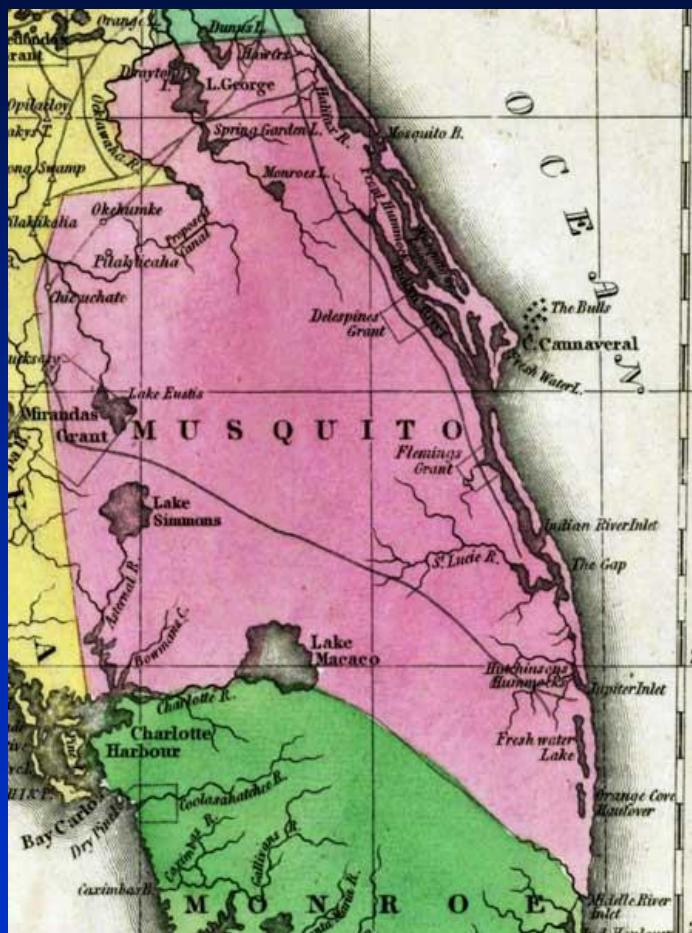


# Presentation Overview

- Mosquito Control Division
- Mosquito-borne Diseases
- Control Techniques
- Outlook



# Mosquito Control Division





# Mosquito Control Division

- Kelly Deutsch – Acting Manager
  - 30 positions
- Total Budget - 2.1 M
  - Operating expenses .5 M
- 18 vehicles





# Mosquito Control Division

- Surveillance and Abatement programs
  - Scheduled
  - Unscheduled
  - Larvae identification
  - Department of Health
  - Sentinel Flocks





# Mosquito-borne Diseases

- **Established Diseases**

- Chikungunya
- Dengue Fever
- West Nile Virus
- St. Louis Encephalitis
- Eastern Equine Encephalitis
- Malaria

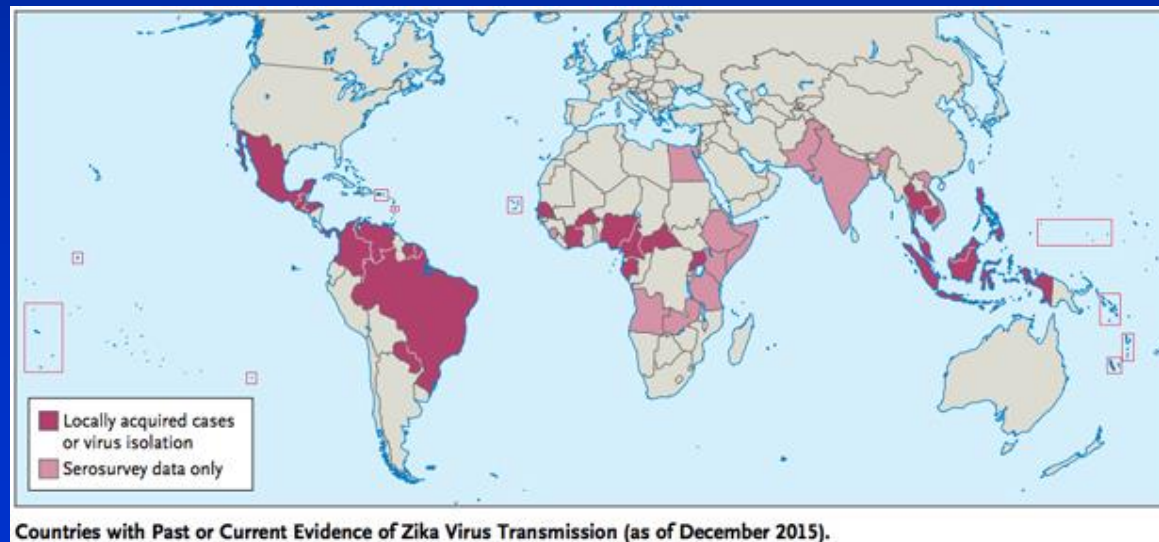
- **New Threat**

- Zika Virus



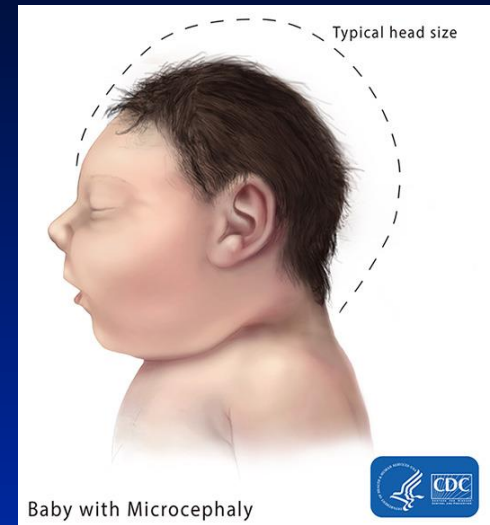
# Zika Virus

- Flavivirus
- Originally discovered in Africa
- Outbreaks in Pacific Asia
- Now spreading throughout South and Central America



# Zika Virus

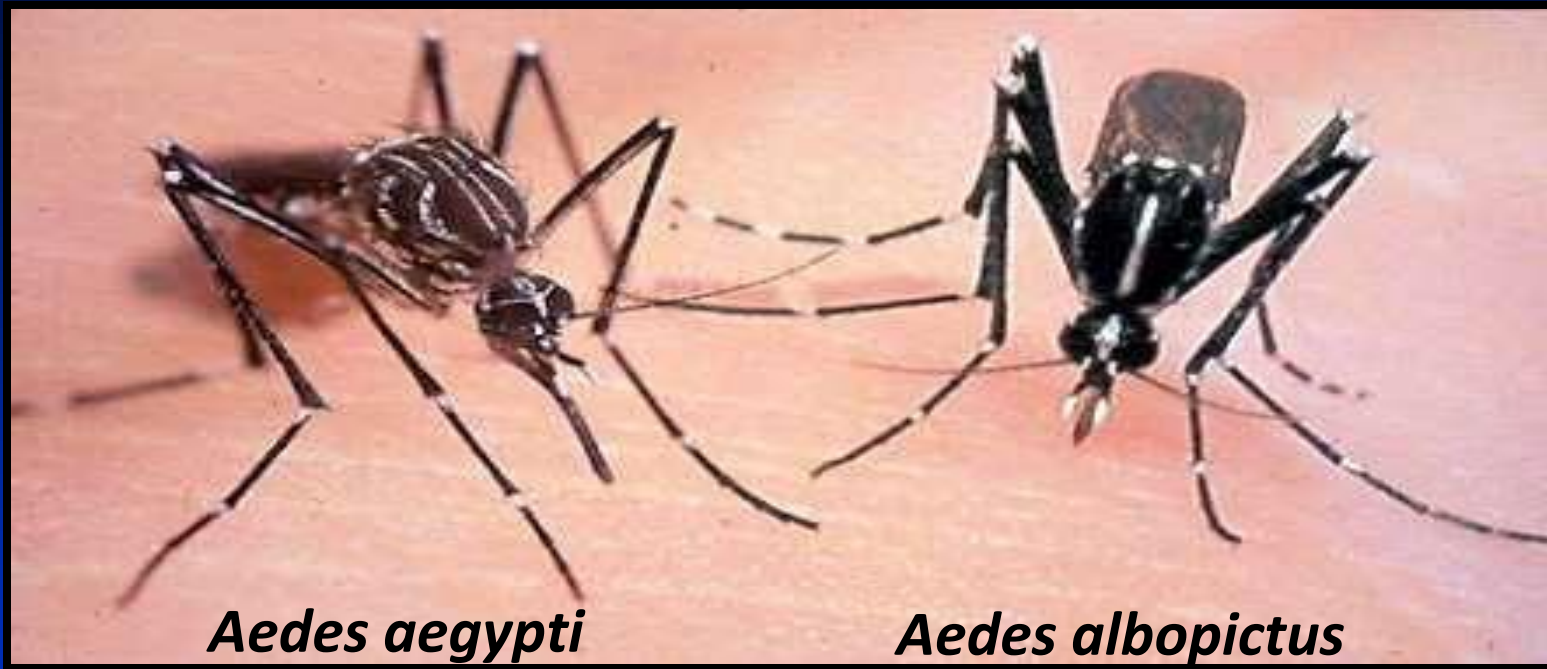
- **Transmission**
  - Mosquito bite
  - Maternal-fetal
  - Rarely sexually transmitted
- **Clinical Presentation**
  - Usually mild
  - Rash, fever, arthralgia, conjunctivitis
  - Recently linked to microcephaly, fetal demise, and Guillian-Barre Syndrome
- Symptoms occur 2-12 days after infection, resolve in 7-10 days
- Blood tests required for confirmation
- No treatment or vaccine available



**Main source of protection is mosquito bite prevention**



# Zika Virus



- Adapted to urban environments
- Day-time biters
- Difficult to control



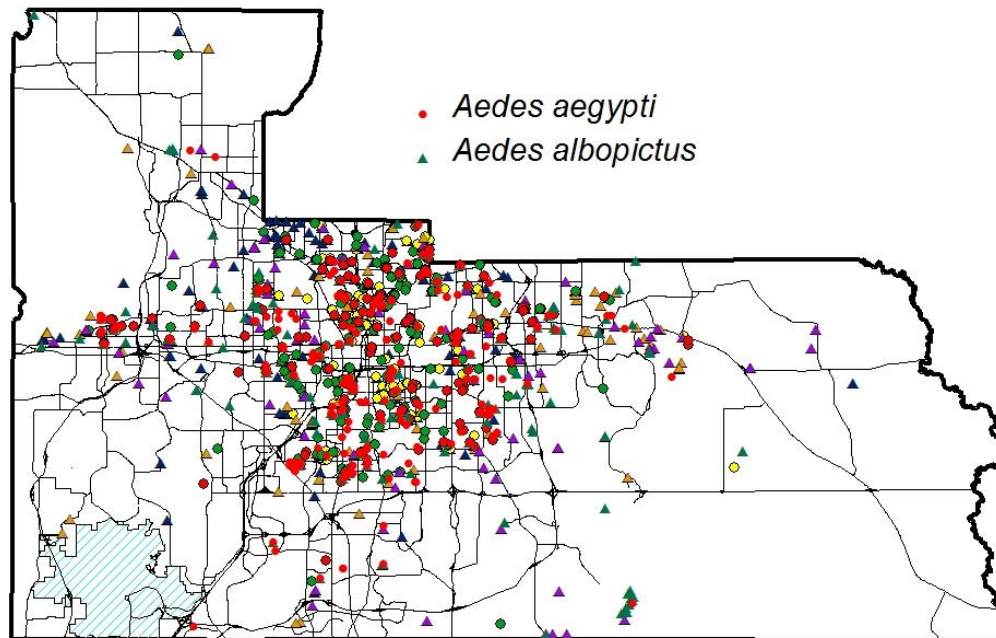
# Zika Virus



- Seek out standing water in containers
- Can grow from eggs to mature (biting) adults in 7 days during summer months



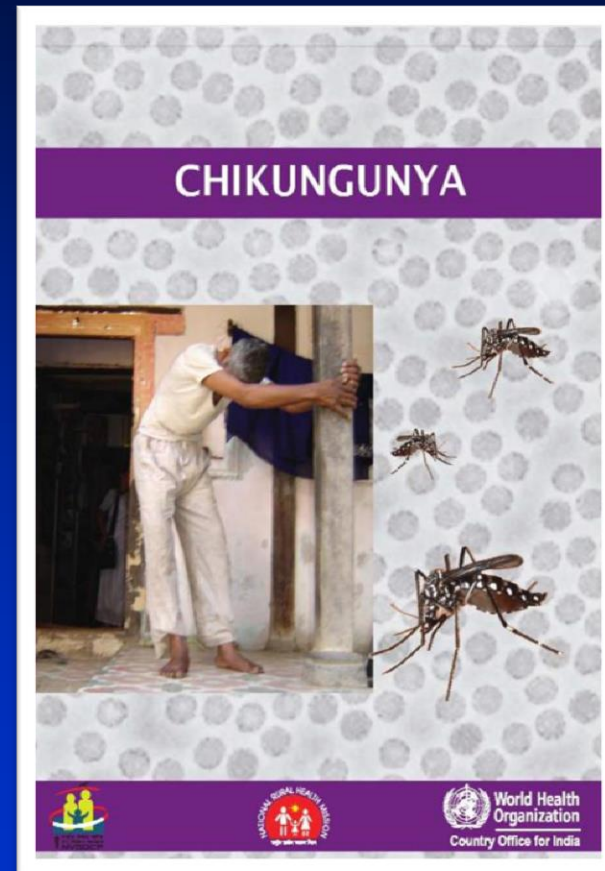
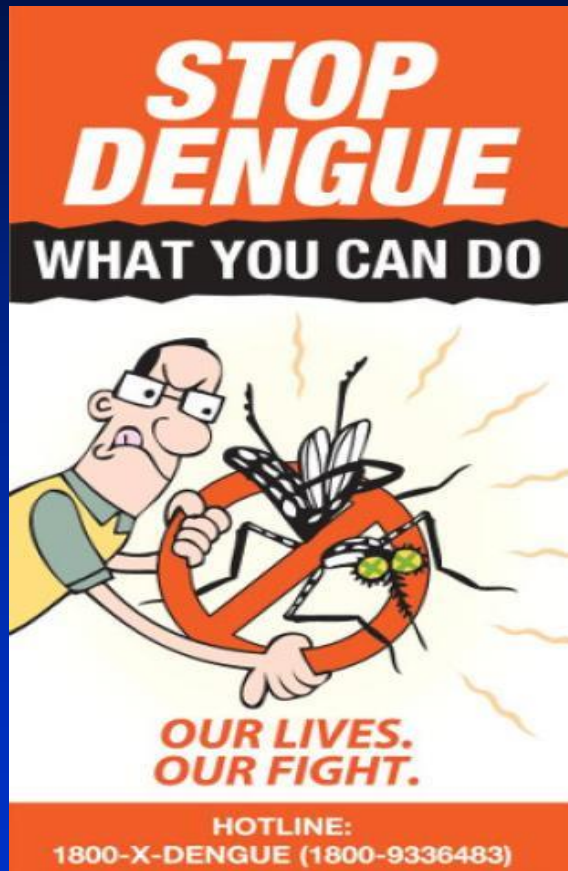
# Zika Virus



Total parcels	Residents home	Percent at home	Permission to inspect	Percent home inspected	% Total Parcels Inspected	# of Houses with containers of water	Total # of containers with water	Total # of containers with larvae	Percent insp. w/ cont.	Percent cont. w/ larvae	Staff Hours
10,716	2,461	23%	1,669	68%	16%	771	1,640	507	46%	31%	2,514



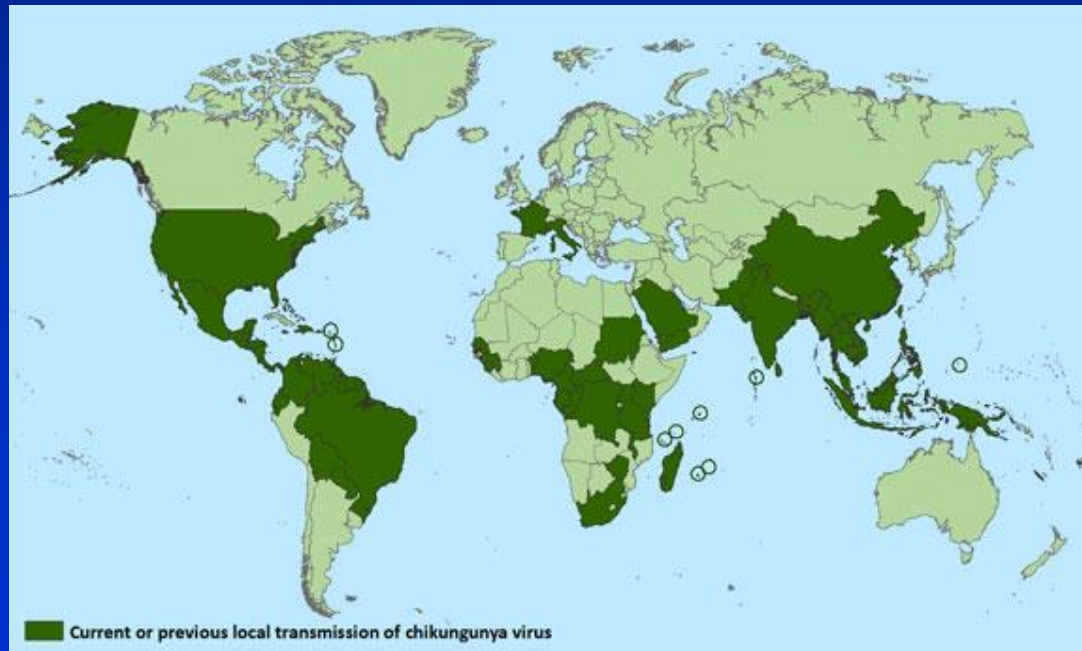
# Mosquito-borne Diseases





# Chikungunya

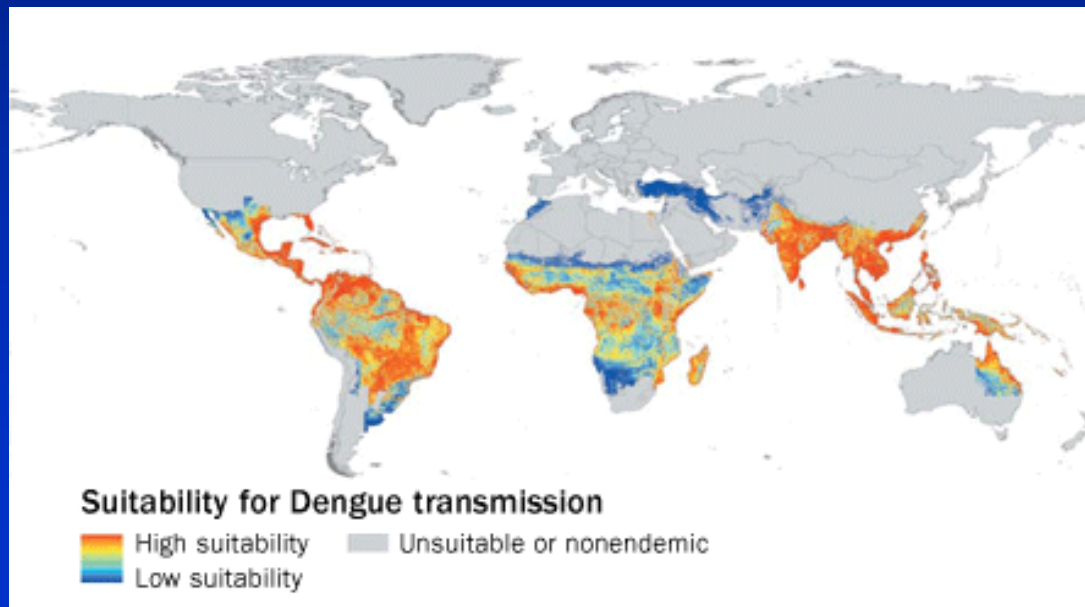
- High fever, rash, arthralgia
- Effects may linger for months
- Quickly spreading throughout region





# Dengue Fever

- High fever, rash, headache, myalgia
- Hemorrhagic variant may be fatal
- Established in Central and South America





# Control Techniques

- Surveillance

- Trap and identify larvae or adult mosquitos





# Control Techniques

- Removal of standing water
- Barrier protection
  - Repellents (DEET)
  - Clothing
  - Screens




**Requires manpower and public engagement**



# Control Techniques

- Larvicide/adulticide
- Timing is important
- Ultra Low Volume
- Less effective for *Aedes species*





## NATULAR™ DT

To be used in conjunction with other control techniques. Do not use in conjunction with other control techniques.

Active Ingredient:	7.95%
Inert Ingredients:	92.05%
Total:	100.00%

Contains 0.1 gram Deltamethrin per milliliter of water. This product may be used to control the growth of the larvae and pupae of the mosquito species *Aedes* in water bodies.

U.S. Patent No. 5,823,544 and 5,823,545

0010 1000 0000

### Keep Out Of Reach Of Children

#### CAUTION

**If in eyes:** Hold eye open and flush with water for 15-20 minutes. Remove contact lenses if present, after the first 5 minutes. Flush contact lenses.

Call a poison center, contact doctor or hospital.

Have the product container or label with you when calling a doctor or hospital.

**Precautionary Statements:**

**Hazards to Humans and Domestic Animals:**

**Caution:** Causes moderate eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water. Avoid contact with food or drink. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

**Environmental Hazards:**

This product is toxic to aquatic invertebrates. Do not apply to water bodies or areas where water bodies are present. Do not apply to water bodies or areas where water bodies are present.

**Directions For Use:**

Read all directions for use carefully before applying.

**General Use Precautions:**

Do not use in conjunction with other control techniques.

**Storage and Disposal:**

Do not store in a place accessible to children.

**Disposal:** Do not dump into water bodies or areas where water bodies are present.

**First Aid:**

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## DUET™

### Bifenthrin Adulticide

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# Mosquito-borne Diseases

## ■ West Nile Virus and St Louis Encephalitis

- Fever, headache, myalgia, meningitis, encephalitis
  - Many are asymptomatic, higher mortality in elderly
- Transmitted by *Culex* Species
- Birds are “amplifying” hosts

## ■ Eastern Equine Encephalitis

- Fever, nausea, vomiting, encephalitis
  - Highest mortality of the arboviruses
- Transmitted by *Aedes vexans*, *Coquillettidia perturbans*, *Ochlerotatus canadensis* and *Ochlerotatus sollicitans*
- Birds are amplifying host



# Control Techniques

- **Surveillance – Sentinel Flocks**
  - Chickens strategically housed around the county
  - Blood samples are taken weekly
  - Results dictate level of threat
- **Prevention and abatement**
  - Insecticides
  - Aerial spraying





# Mosquito-borne Diseases

## ■ Malaria

- Among the leading causes of death by infectious disease worldwide
- Transmitted by the *Anopheles* species
- Chemoprophylaxis exists for travelers
- Rare local transmission in Florida



- Zika - CDC/DOH guidance for testing and travel warnings
- *Aedes* species control
  - Difficulties (plastic and rubber waste, access to property)
  - Chikungunya threat looming
- Boots on the ground



## ■ Orange County Mosquito Control

- Increasing Surveillance (door-to-door, traps)
- Utilizing special equipment and insecticides
- Increasing public outreach

## ■ Health Emergency

- Gather Stakeholders
  - FL Department of Health in Orange County
  - Emergency Management
  - Communications
  - Code Enforcement

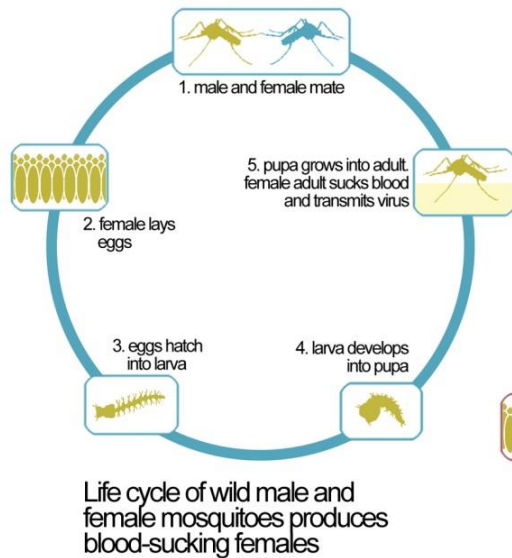
## ■ Citizens

- Use screens and air conditioning
- Manage standing water on property

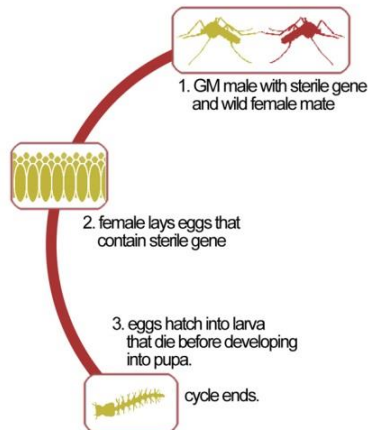


# Outlook

## The future of Mosquito Control?

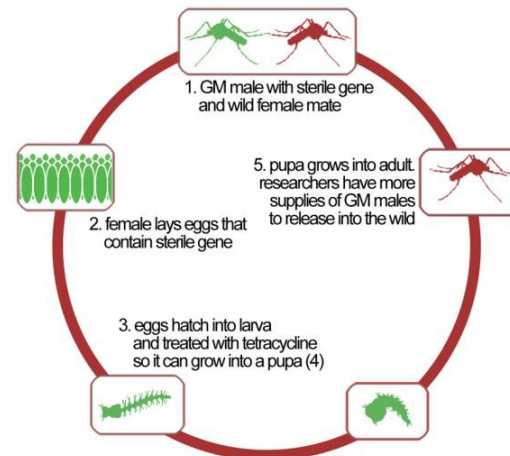


Introduction of GM males breaks this cycle as faulty gene causes offspring to prematurely die



More GM males are created in the lab by adding tetracycline to larvae to allow development

## How GM mosquitoes work





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