

Zika and *Aedes* Vector(s) in New Jersey

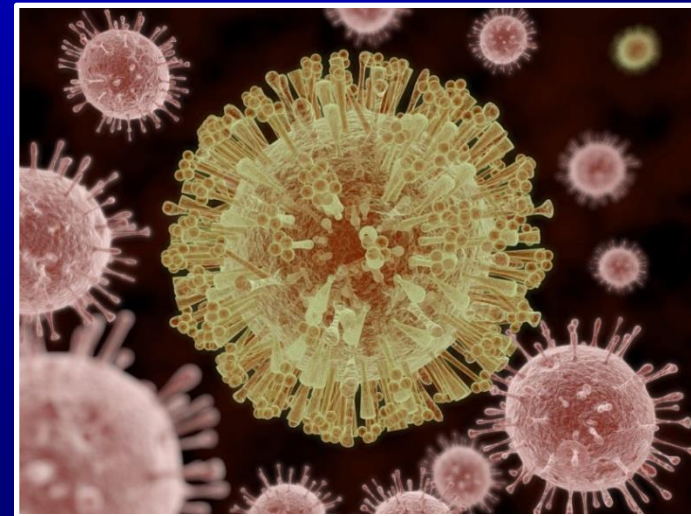
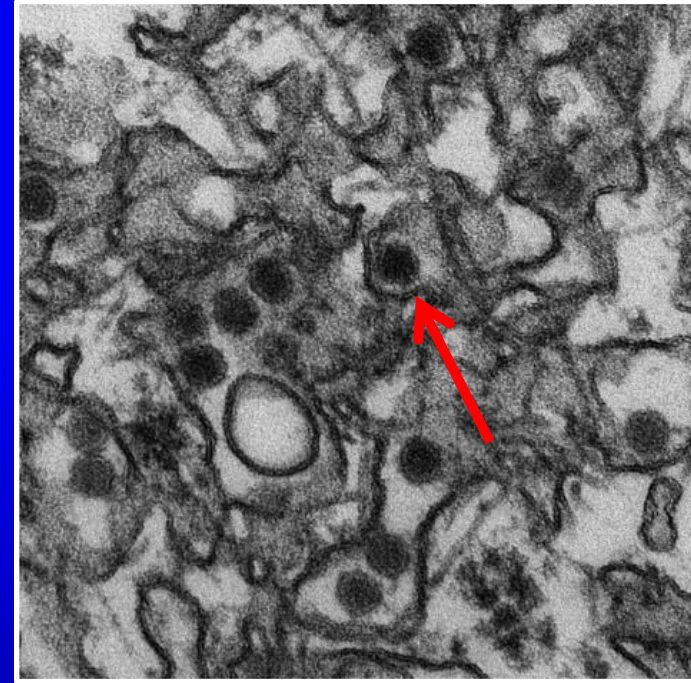
**NJACCHO Zika Virus Workshop
22-June-2016**

**Scott C. Crans
Rutgers Entomology/CVB/OCPE
Contact Info: scott.crans@rutgers.edu
Phone 848 932-6497**

Objectives

- Introduction
- Vector species
- Anticipated activity
- Public engagement

**Mosquito control is everybody's responsibility
It is a big job & everyone needs to do their part!**



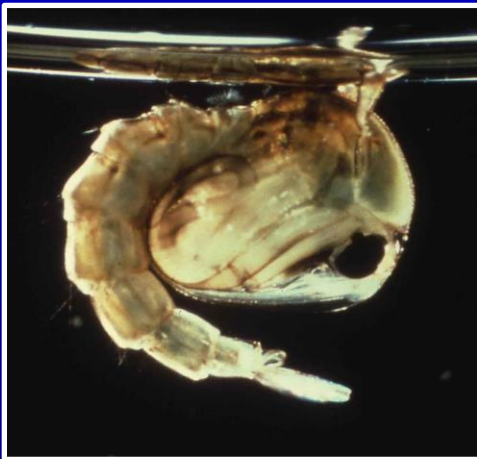
Mosquito life cycle



Terrestrial Adult

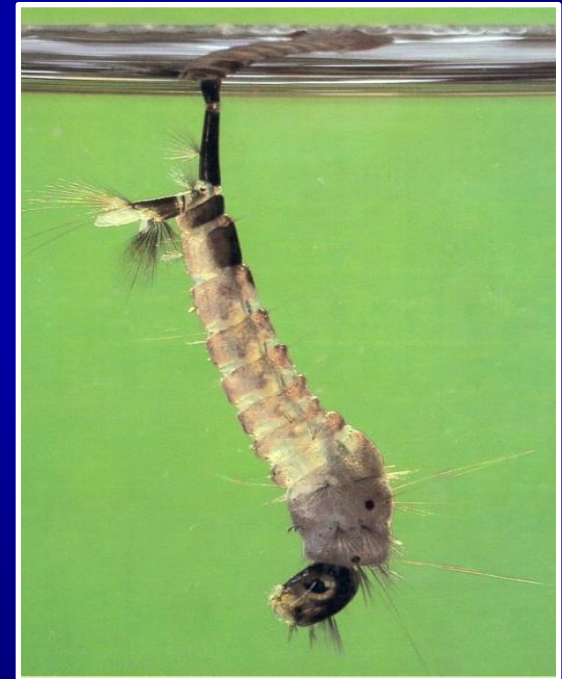


Egg



Aquatic Pupa

**Remove the water
Remove the problem**



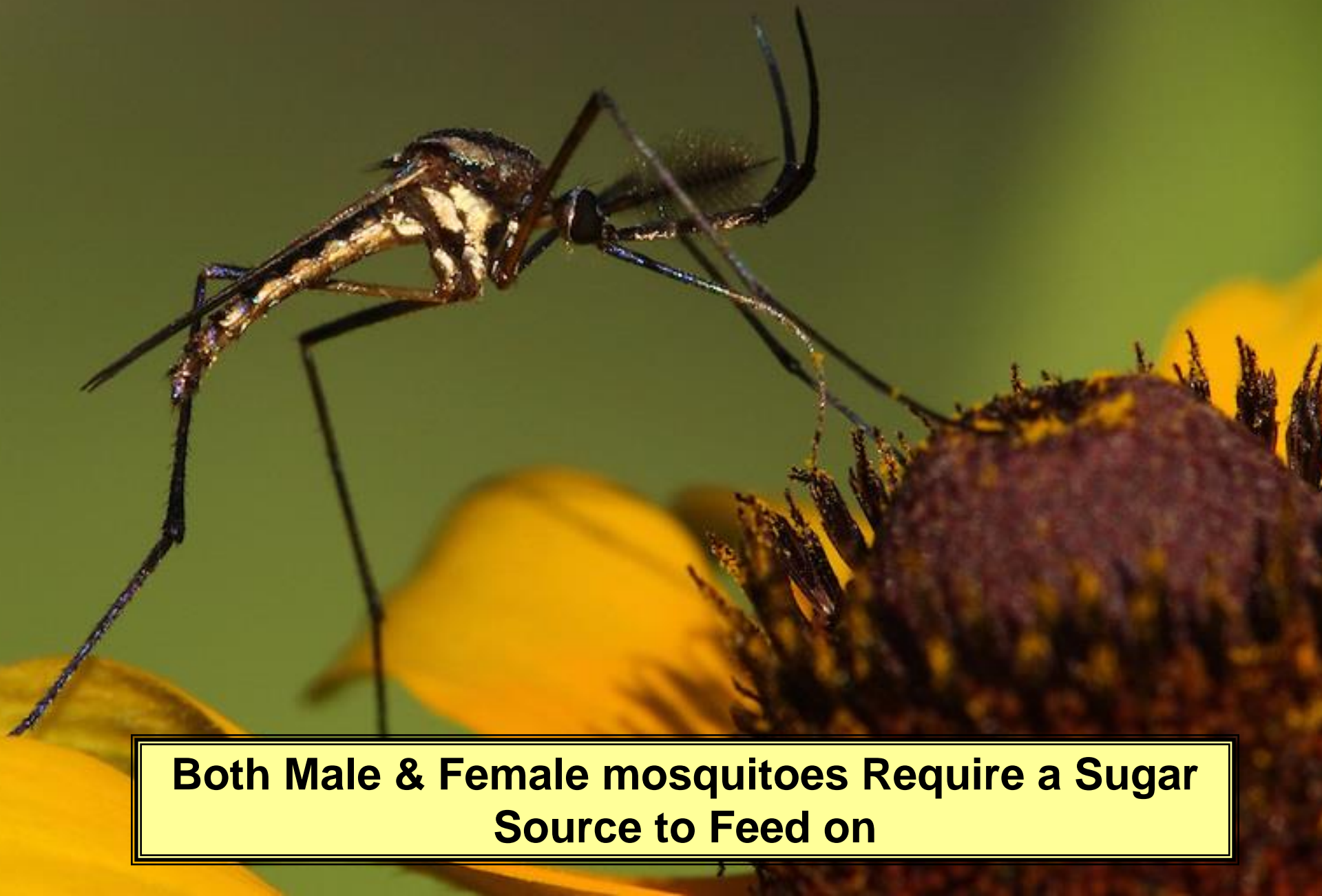
Aquatic Larva



Female Mosquitoes Bite - Need Blood to Reproduce



Use Protein in Blood to Produce Eggs



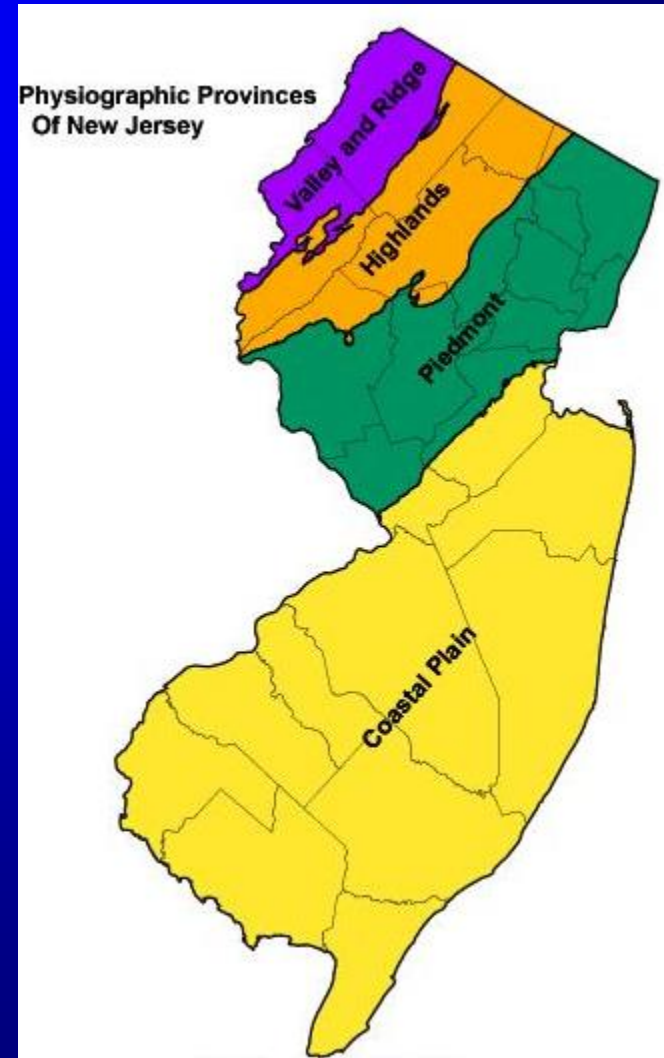
Both Male & Female mosquitoes Require a Sugar Source to Feed on

Mosquito larvae develop in shallow bodies of stagnant water



New Jersey mosquitoes

- 63 species
- Preferred larval habitat
- Most harmless
- Species diversity tied to regions
- Domestic mosquitoes



Knowing the species biology is key to successful control

Life cycle types



**Floodwater Life Cycle
(Aedes Model)**



**Permanent Water Life Cycle
(Domestic Culex Model)**

Floodwater mosquitoes

Eggs must dry down

**Can wait in a state of
suspended animation
until conditions are
right for hatching**

**Hatch in broods after
each summer rain**



Most floodwater mosquitoes are avid human biters

Permanent water mosquitoes

Eggs must remain moist

A few have pollution tolerance

Never occur in broods

Tend not to range



WNV vectors in this group are mainly bird feeders

Overwintering mechanisms differ



**Floodwater Mosquito
overwinter as Eggs**



**Permanent Water Mosquitoes
Hibernate as Mated Females**

Review

Floodwater mosquitoes
use temporary pools

Permanent water
mosquitoes use
bogs & swamps

Container habitats
support both life cycle
types

Containers common in
backyard setting

Containers move
w/ people



Old Maps

Approximate distribution of *Aedes aegypti* in the United States*



Approximate distribution of *Aedes albopictus* in the United States*



Maps were developed by CDC using currently available information. Mosquito populations may be detected in areas not shaded on this map, and may not be consistently found in all shaded areas.

CDC Survey widely distributed

<https://docs.google.com/forms/d/1eqWDzmFw7AEGDyooZwpUXsebz8qrUkzQJ82PDiYLPI/viewform?c=0&w=1>

NJAES encouraged local NJ programs fill out survey based on county records

Estimated Range of *Aedes aegypti* and *Aedes albopictus* in the United States

Estimated range of *Aedes aegypti* in the United States, 2016*



Estimated range of *Aedes albopictus* in the United States, 2016*



*These maps **DO NOT** show:

- Exact locations or numbers of mosquitoes living in an area
- Risk or likelihood that these mosquitoes will spread viruses

These maps show:

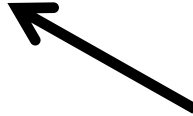
- CDC's best estimate of the potential range of *Aedes aegypti* and *Aedes albopictus* in the United States
- Areas where mosquitoes are or have been previously found

Actual distribution of both species is patchy

Aedes aegypti mosquitoes are more likely to spread viruses like Zika, dengue, chikungunya, and other viruses than other types of mosquitoes like *Aedes albopictus* mosquitoes.

**New maps (*Aedes aegypti*)
generated considerable attention!**

Information likely being misinterpreted



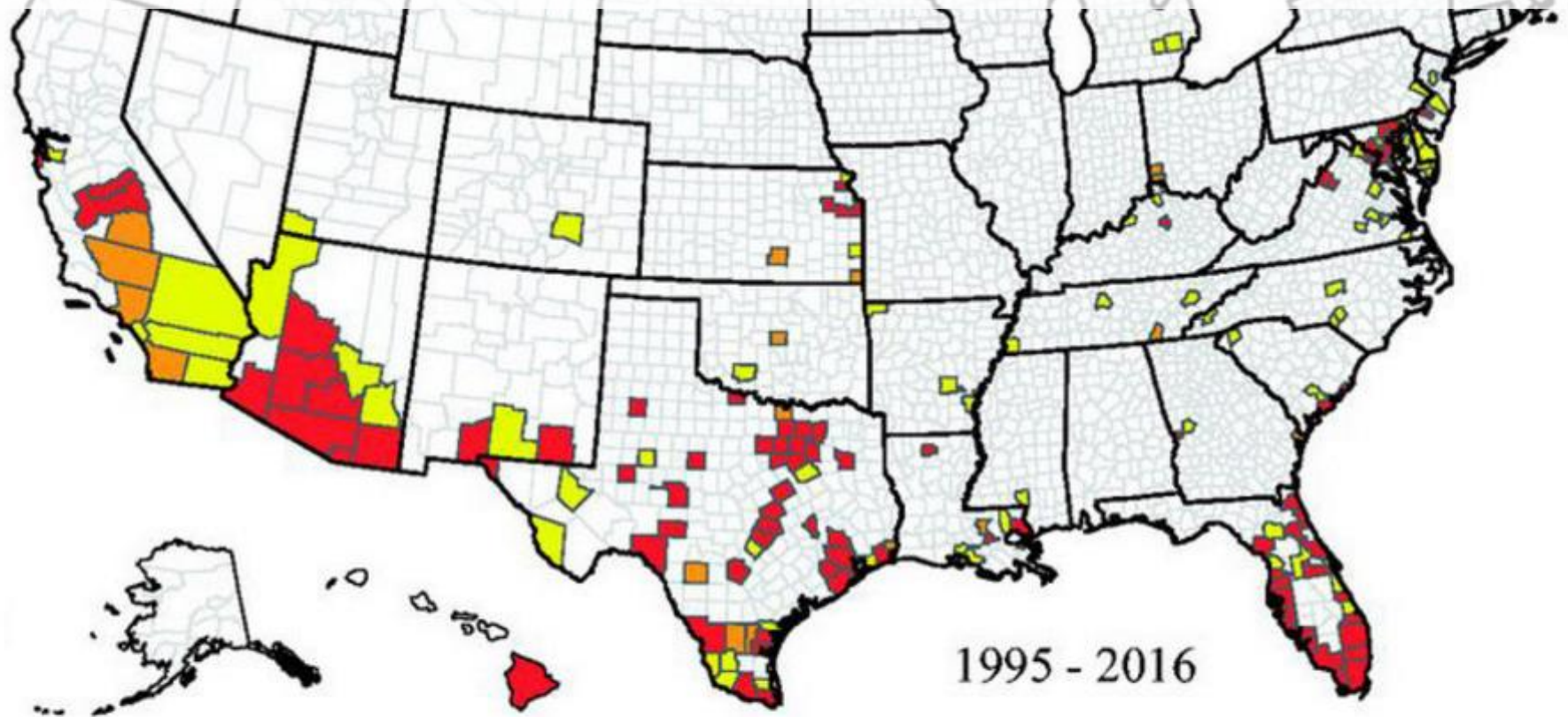


ZIKA

FEAR

Caution:

- 1) Not all counties collect/report mosquito surveillance data across the US. Local programs not supported.
- 2) Surveillance effort that is in place significantly varies



Counties where *Aedes aegypti* was reported between Jan. 1, 1995, and March 2016. Counties in yellow recorded one year of *A. aegypti* being present; those shown in orange recorded two years; and those shown in red, three or more years.

Zika vectors

- Container mosquitoes
- Develop in $<1L$ of water



Endless examples





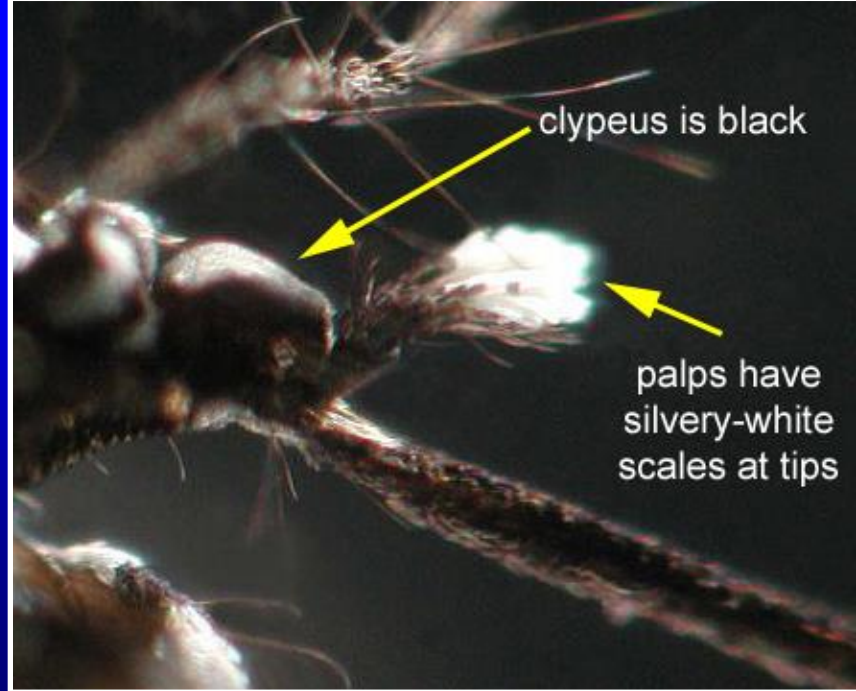
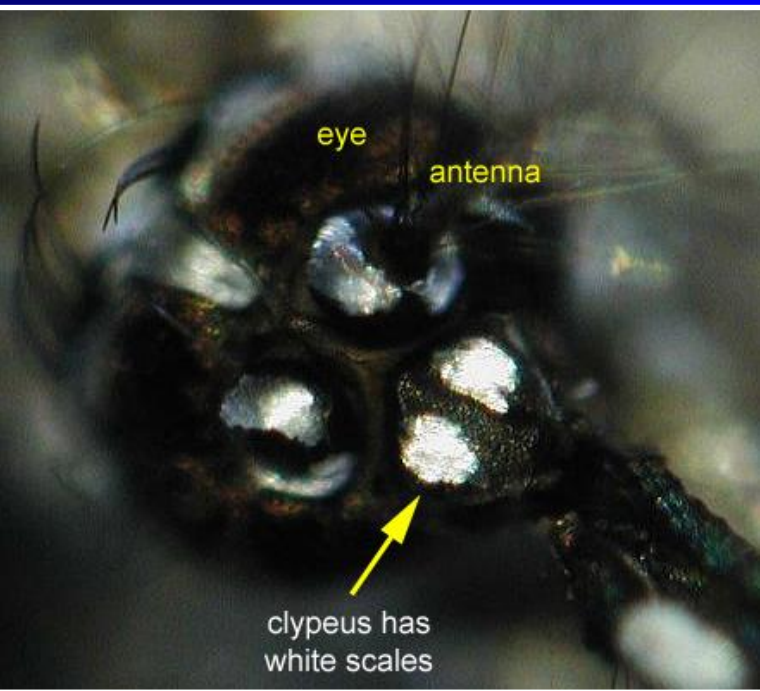
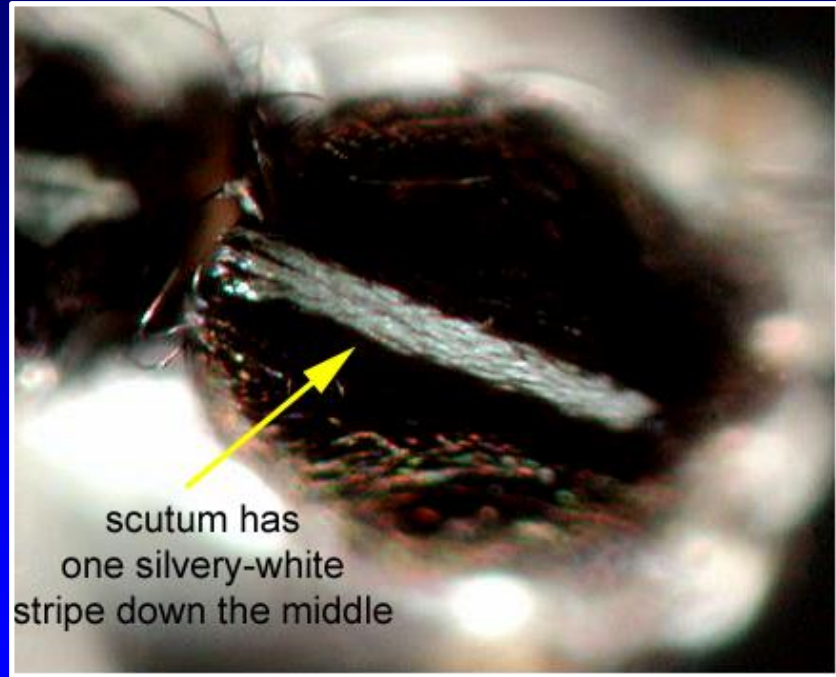
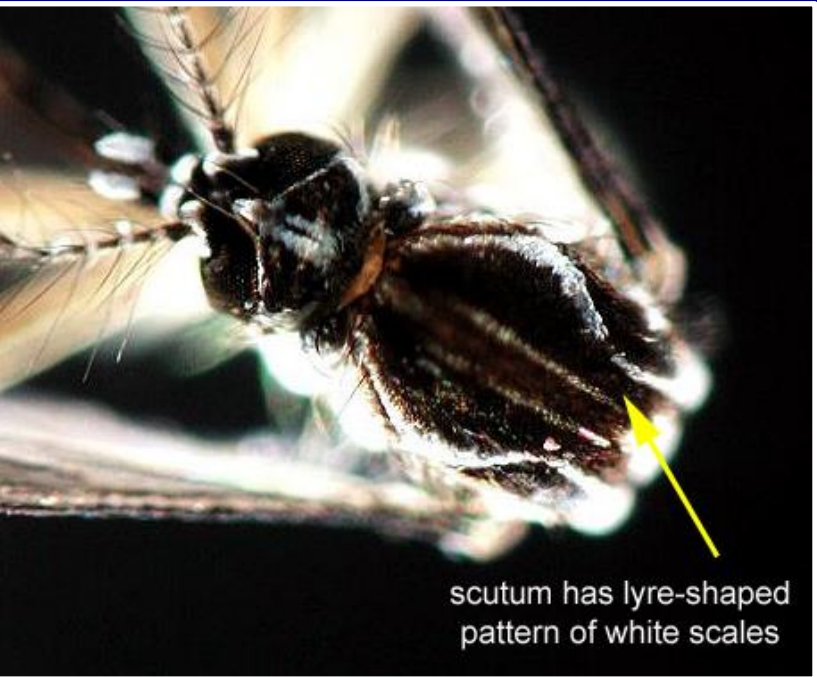
Aedes aegypti

- **Urban mosquito**
- **Container habitats**
- **Stealthy day biting mosquito** (dusk & dawn)
- **Multiple bloodmeals**
- **Endophilic**
- **Anthropophilic**
- **Cannot survive winter** (cold kills eggs)
- **Not established in NJ**
- **Must be reintroduced**
- **Occasional problem inside the house and in the backyard**
- **1991 last confirmed population in NJ**

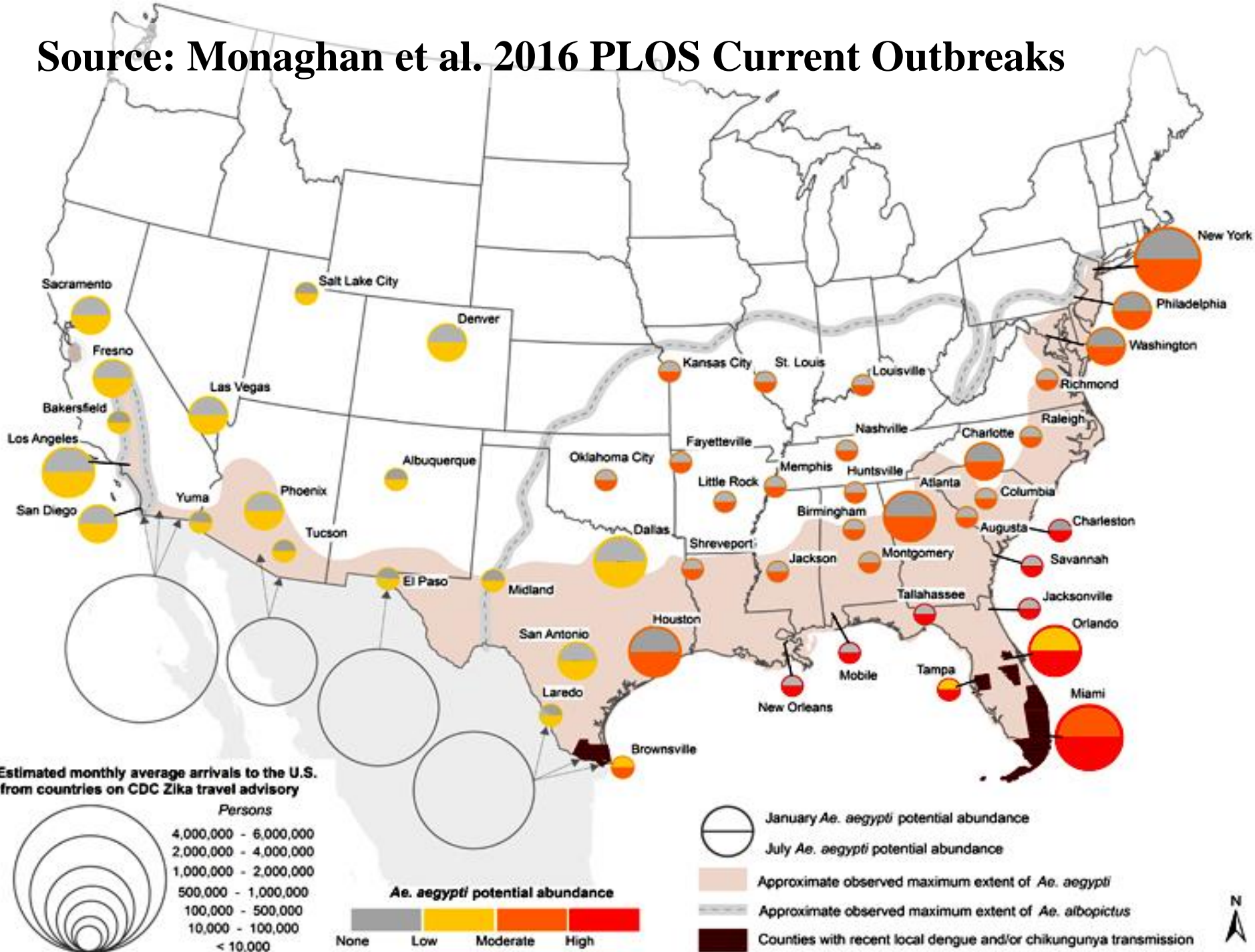


Aedes albopictus

- **Highly adaptive**
- **Natural & artificial containers**
- **Rural & suburban populations**
- **Opportunistic day biting** (dusk & dawn)
- **Will feed at night**
- **Outside & inside**
- **Wider host range**
- **Established in NJ, 95**
- **Eggs survive winter**
- **Annual backyard problem**



Source: Monaghan et al. 2016 PLOS Current Outbreaks





ZIKA
Action Plan
SUMMIT
CDC Atlanta, GA

April 1, 2016

Recipe for producing mosquitoes

1. Water + 7 d
2. Sugar source
3. Suitable host



Contact information

- Scott C. Crans
- Entomology, CVB, OCPE, 180 Jones Ave. New Brunswick, NJ 08901
- OCPE (848) 932-9271 (Main Office)
- CVB (848) 932-6497 (Headlee Labs)
- Skype scott.crans
- E-mail scott.crans@rutgers.edu
- Web site <http://vectorbio.rutgers.edu/outreach.php>

**Mosquito control is everybody's responsibility
It is a big job & everyone needs to do their part!**