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THE STATE UNIVERSITY OF NEW JERSEY

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

NJACCHO Zika Virus Workshop

22-June-2016

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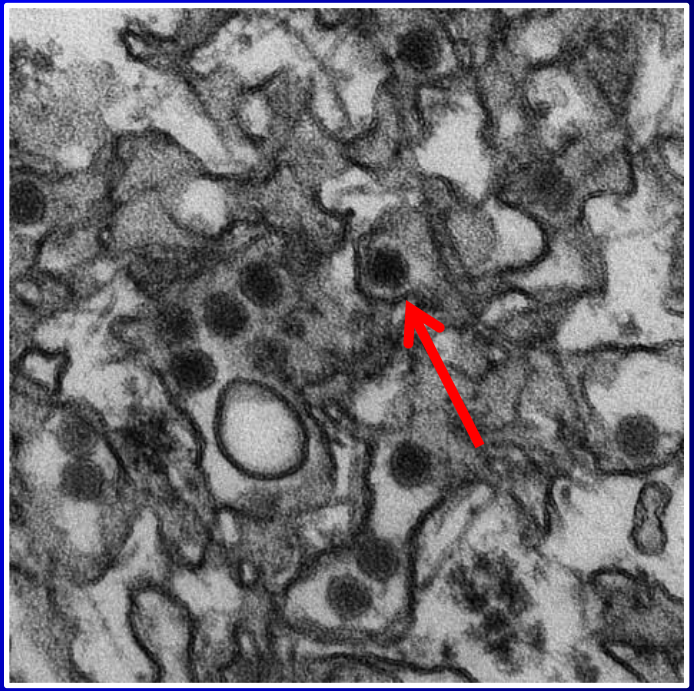
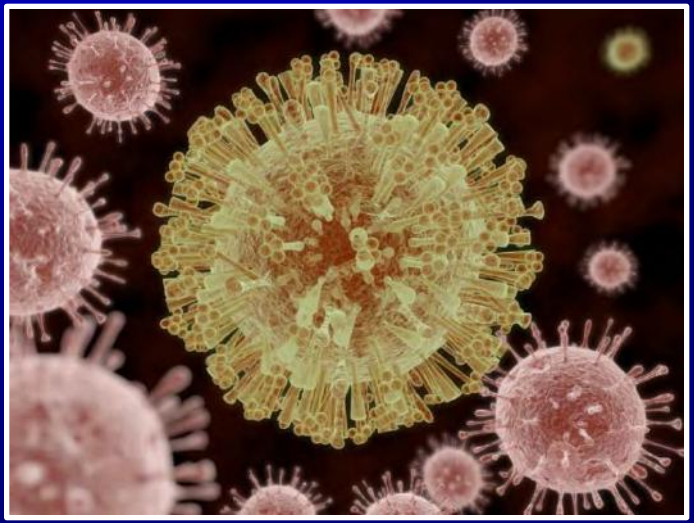
Objectives

- Introduction
- Vector species
- Anticipated activity
- Public engagement



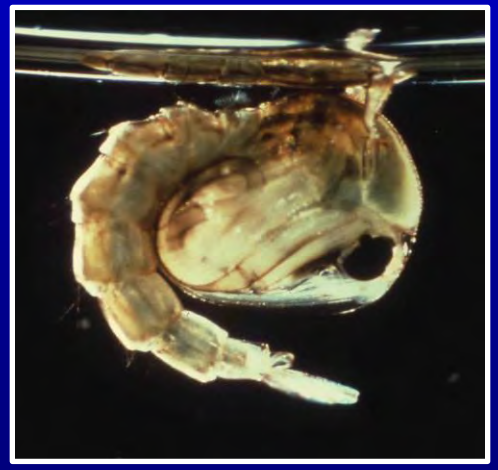


Mosquito control is everybody's responsibility
It is a big job & everyone needs to do their part!

Mosquito life cycle

Terrestrial Adult

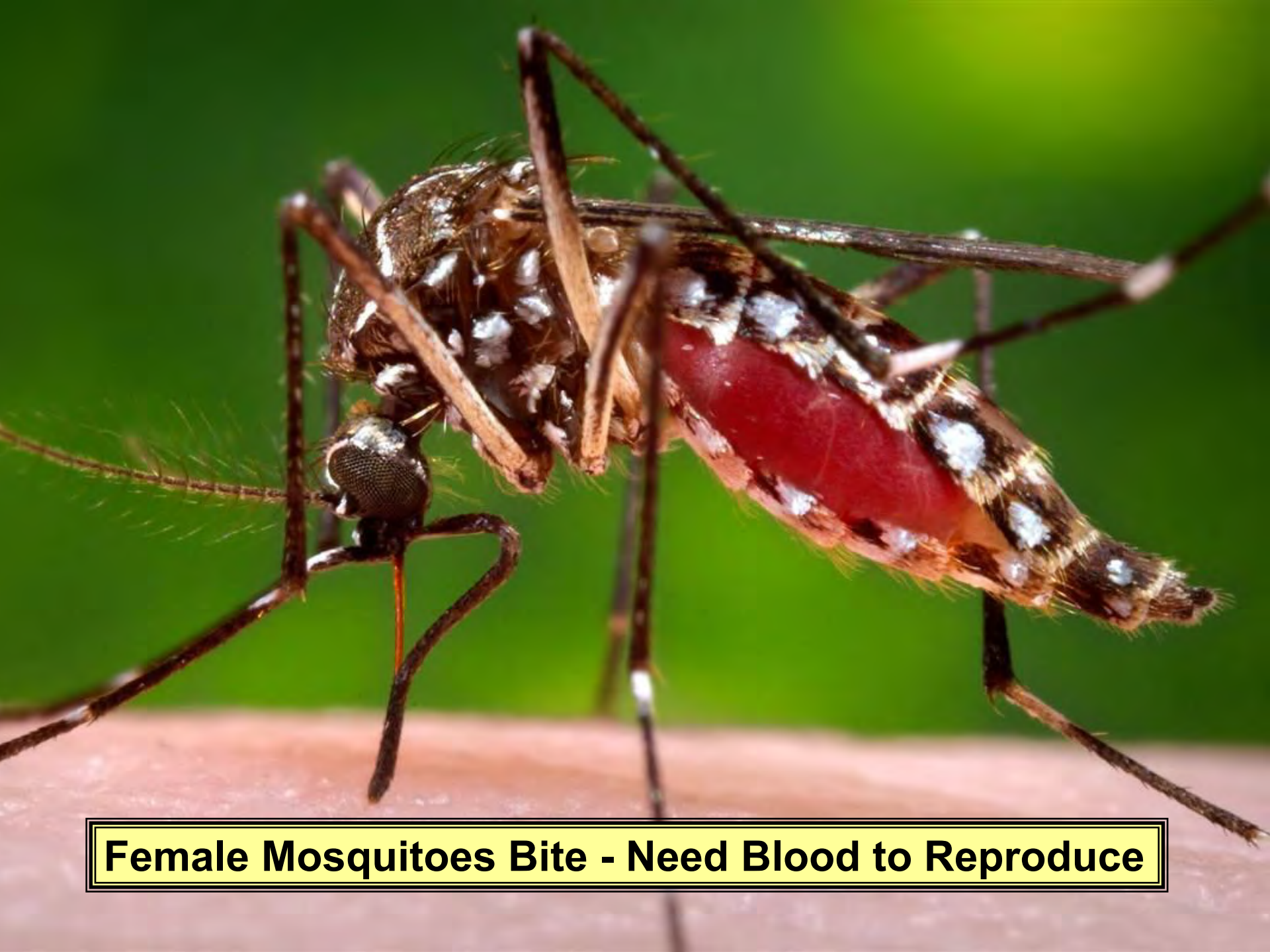
Egg

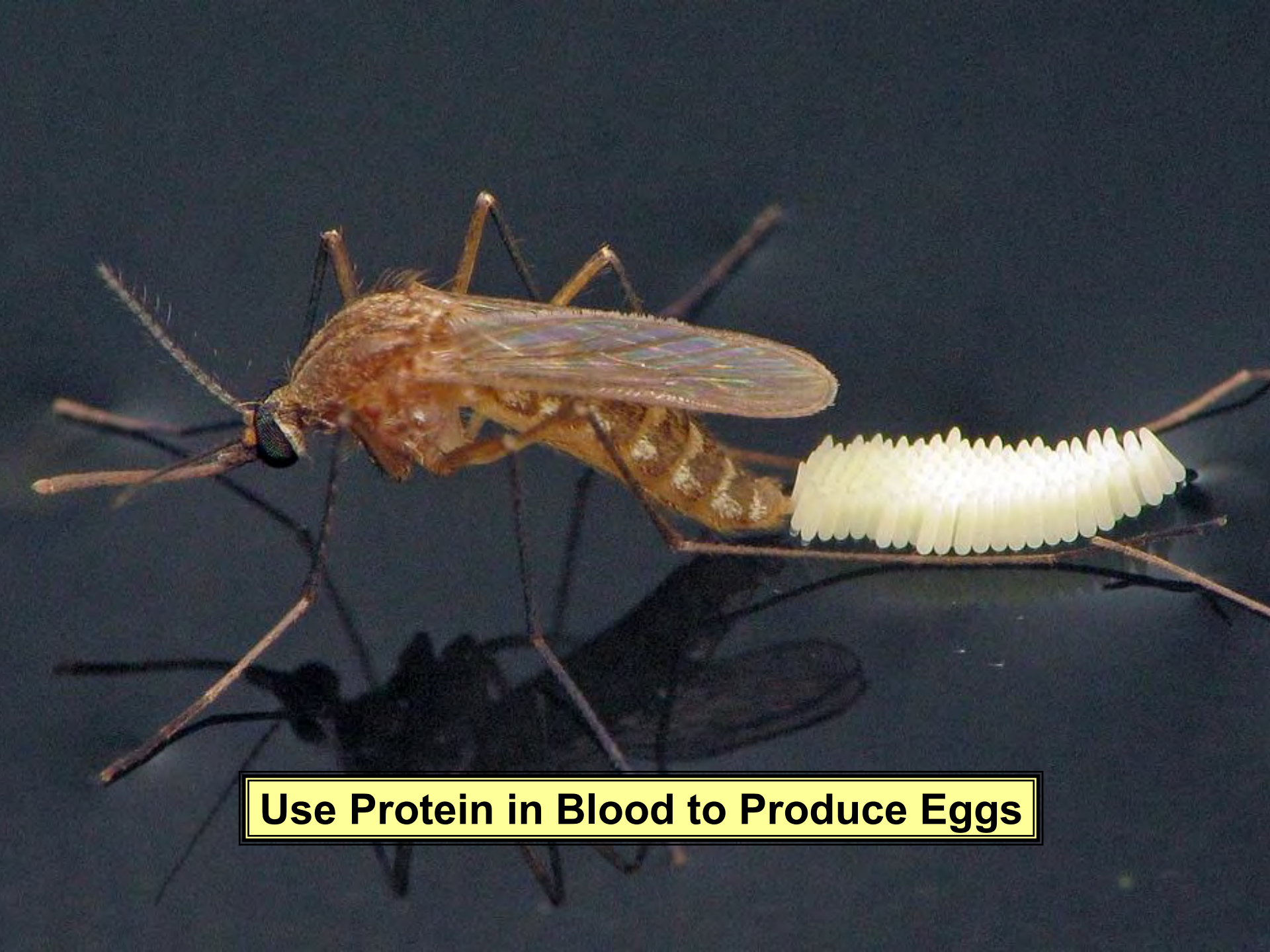


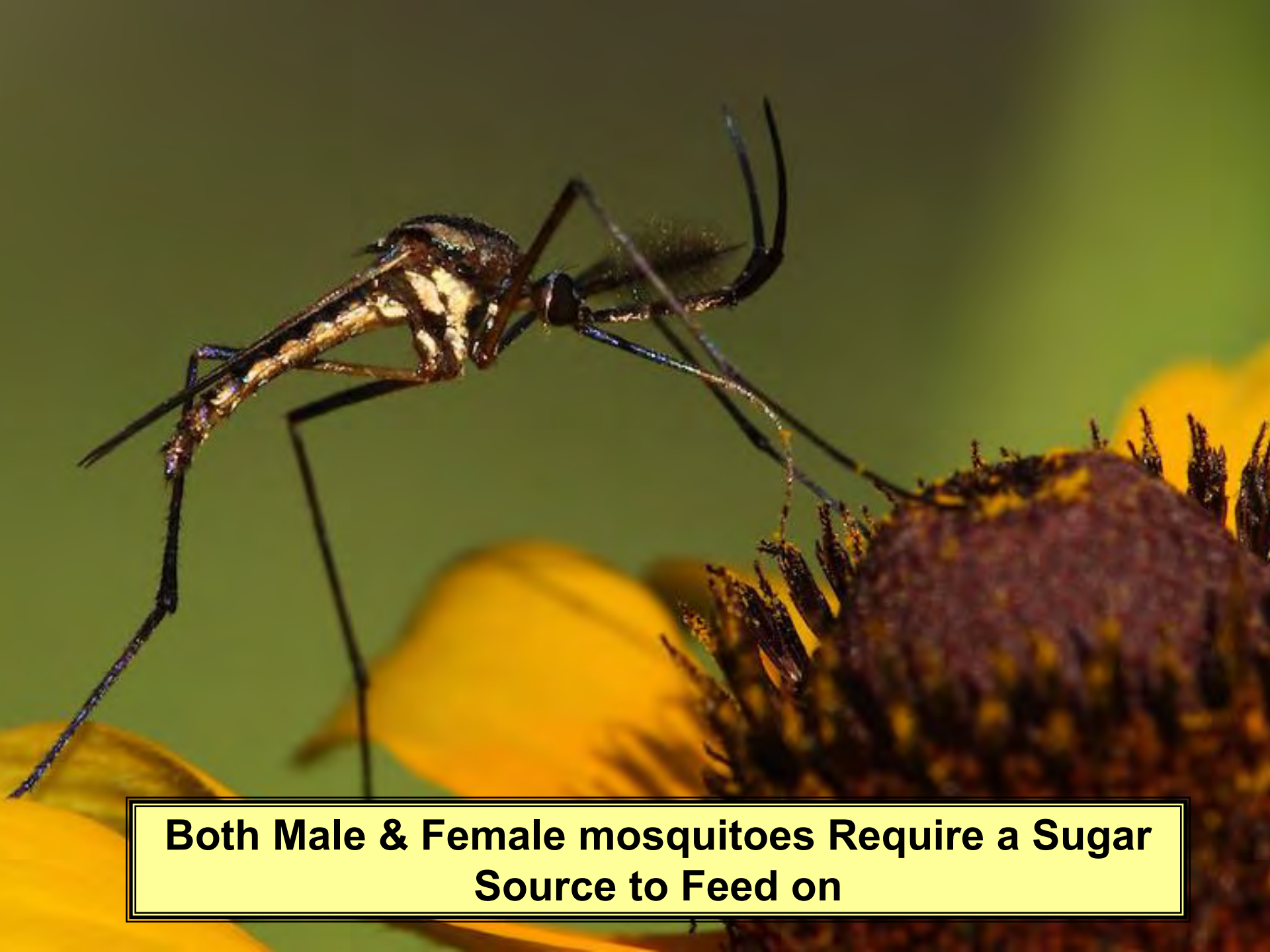
Aquatic Pupa

Remove the water
Remove the problem

Aquatic Larva


Female Mosquitoes Bite - Need Blood to Reproduce


Use Protein in Blood to Produce Eggs

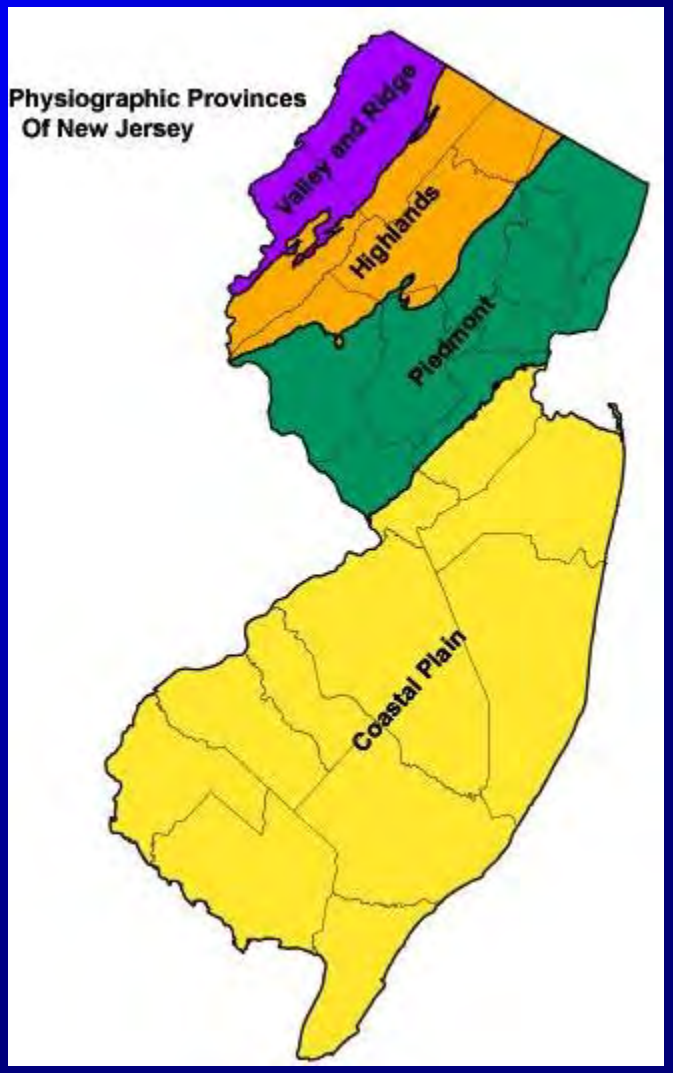


Both Male & Female mosquitoes Require a Sugar Source to Feed on

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

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/1eqWDzmFw7AEGDyooZwpUXsebzh8qrUkzQJ82PDiYLPI/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

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

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

Information likely being misinterpreted

Actual distribution of both species is patchy

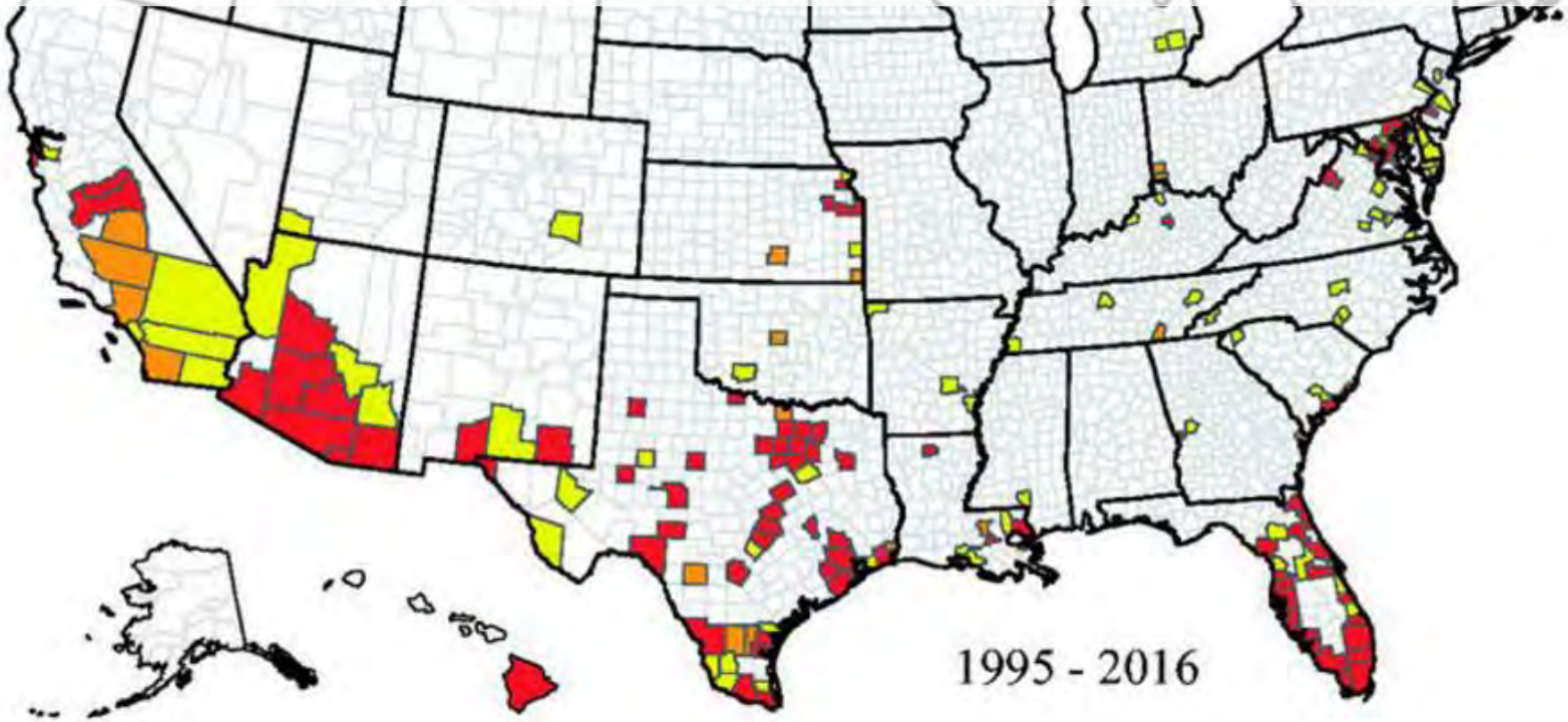
Aedes aegypti mosquitoes are more likely to spread viruses like Zika, dengue, chikungunya, and other viruses than other types of mosquitoes like *Aedes albopictus* mosquitoes.

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**



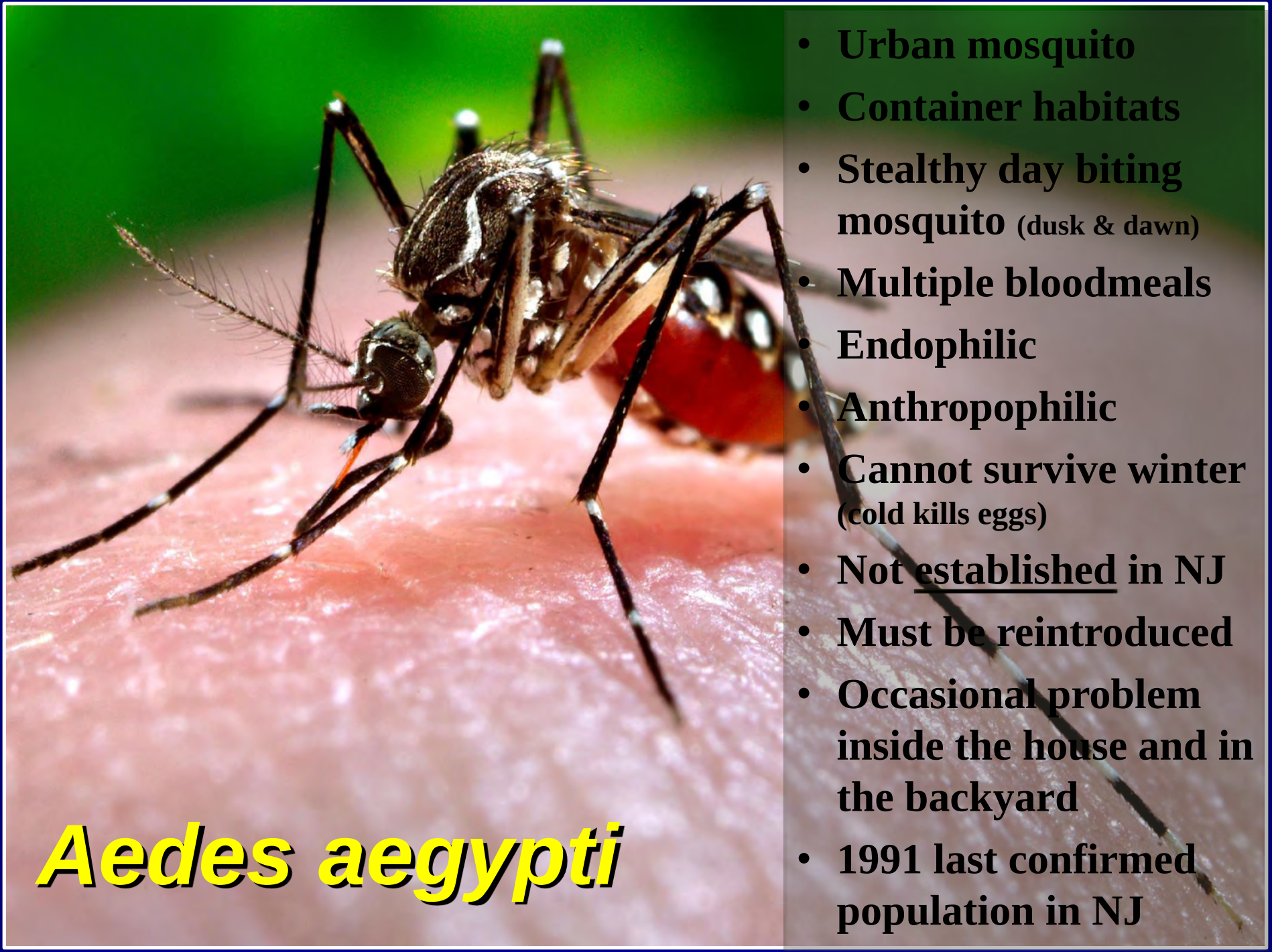
Counties where *Aedes aegypti* was reported between Jan. 1, 1995, and March 2016. Counties in yellow recorded one year of *A. aegypti* being present; those shown in orange recorded two years; and those shown in red, three or more years.

Centers for Disease Control and Prevention

Zika vectors

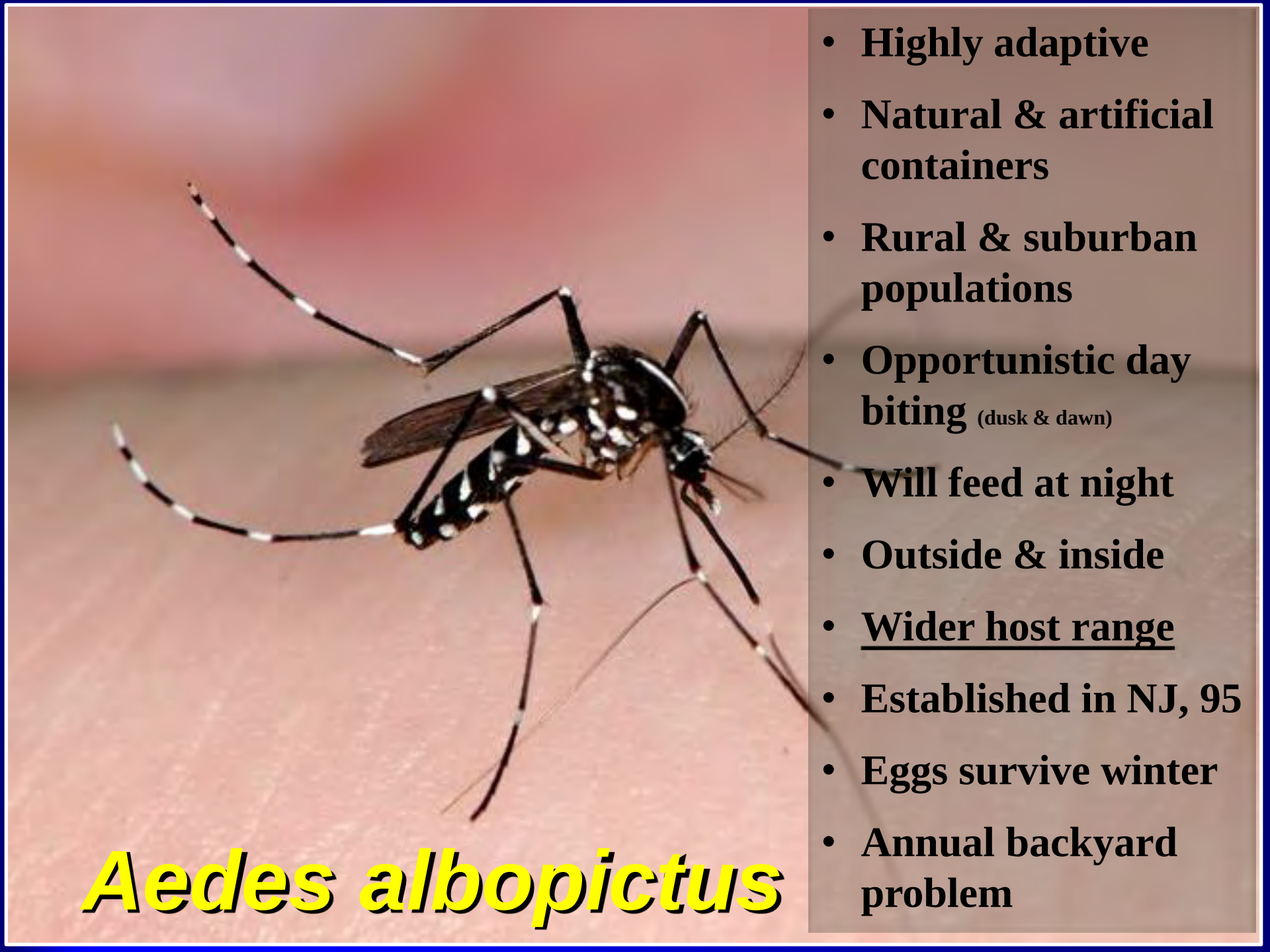
- Container mosquitoes
- Develop in <1L of water

Endless examples



Aedes aegypti

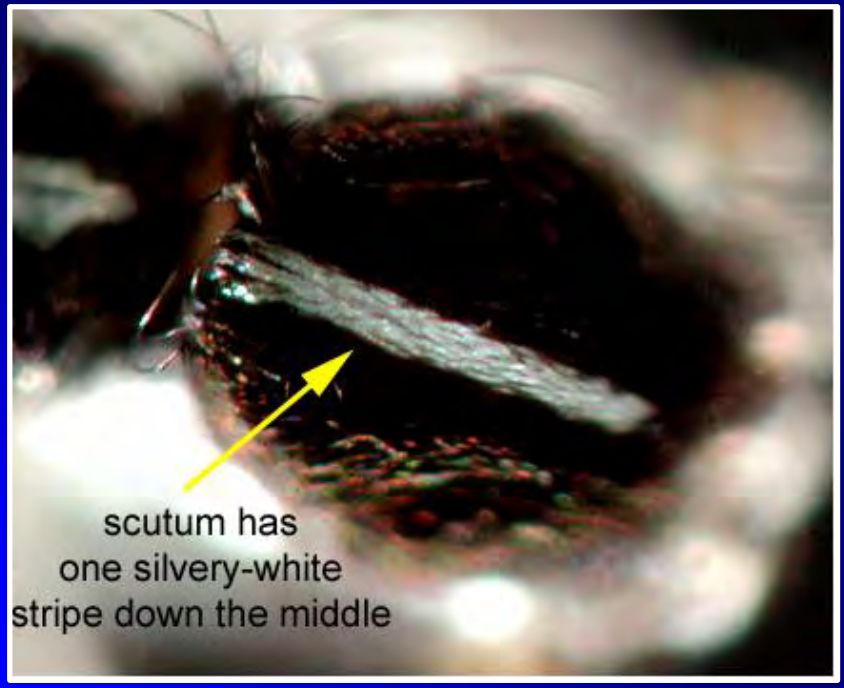
- Urban mosquito
- Container habitats
- Stealthy day biting mosquito (dusk & dawn)
- Multiple bloodmeals
- Endophilic
- Anthropophilic
- Cannot survive winter (cold kills eggs)
- Not established in NJ
- Must be reintroduced
- Occasional problem inside the house and in the backyard
- 1991 last confirmed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

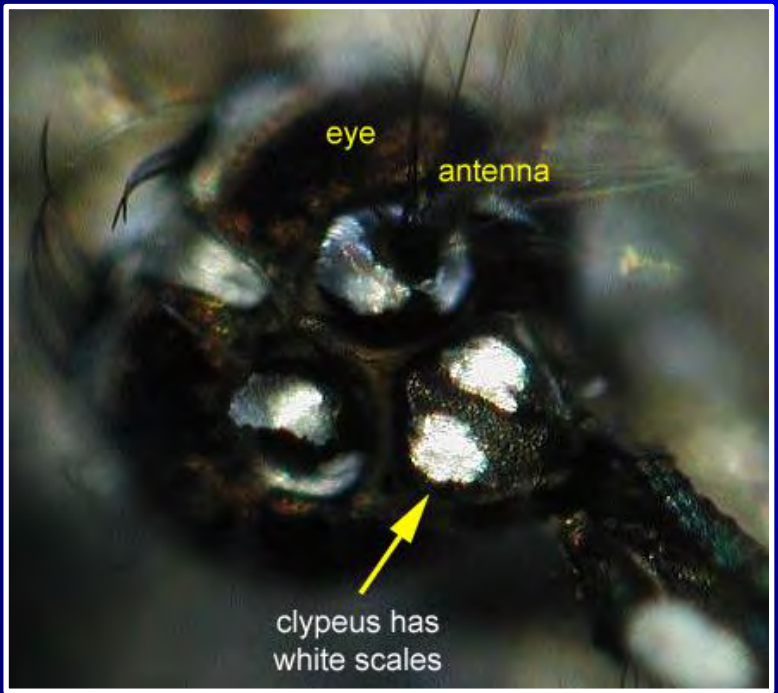


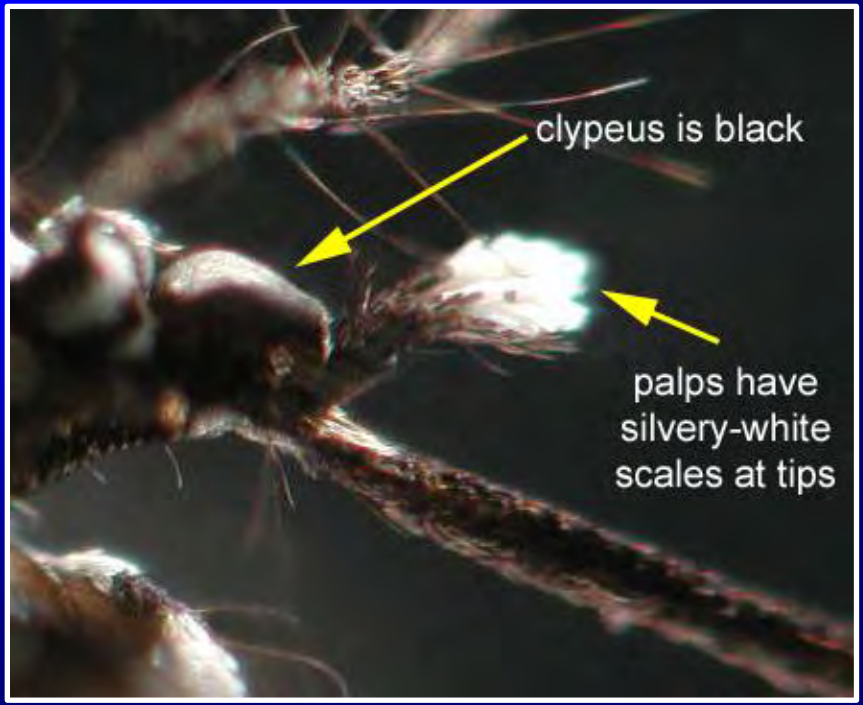
Aedes albopictus

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

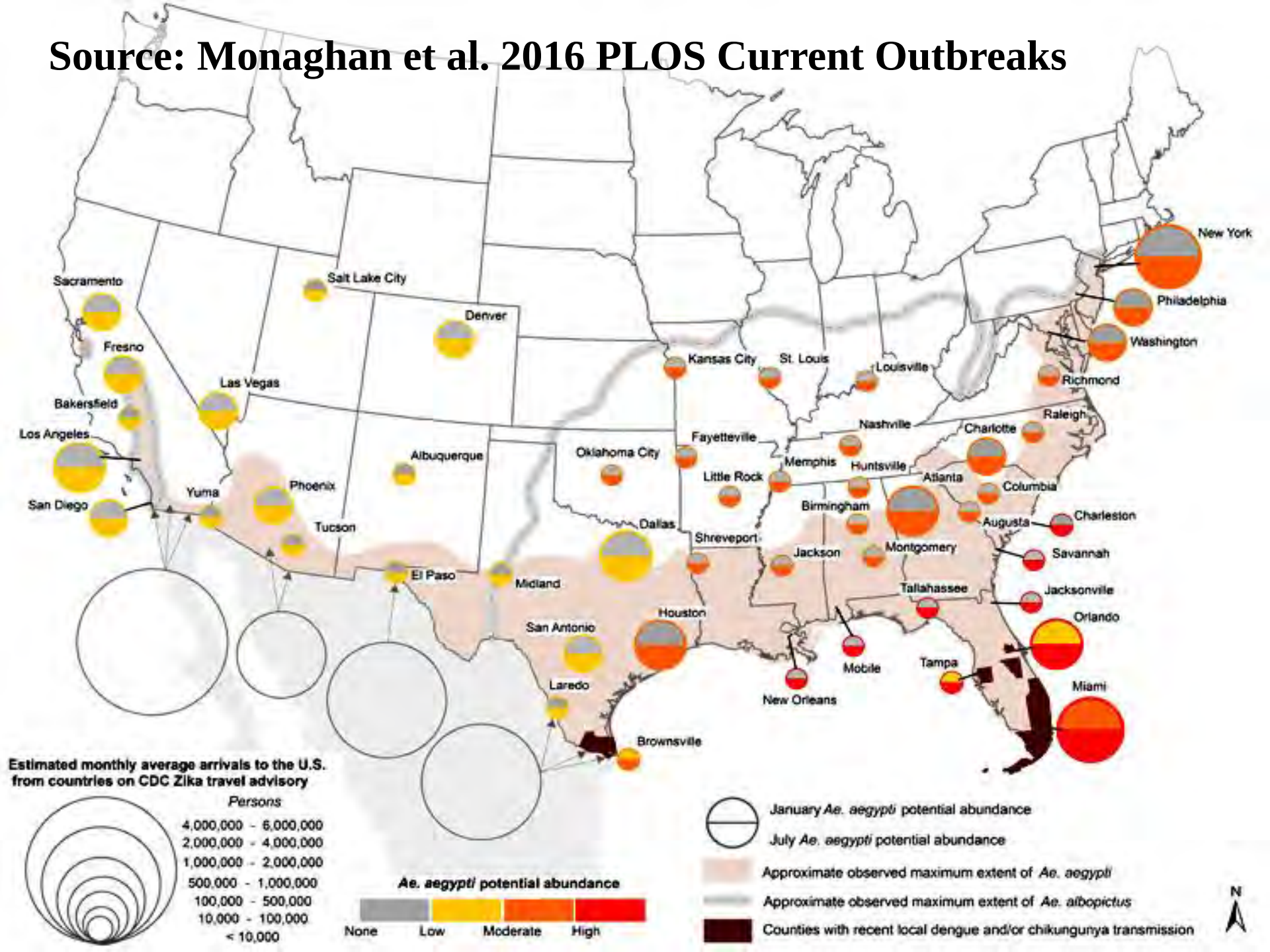
scutum has lyre-shaped
pattern of white scales


scutum has
one silvery-white
stripe down the middle


eye
antenna
clypeus has
white scales


clypeus is black
palps have
silvery-white
scales at tips

Source: Monaghan et al. 2016 PLOS Current Outbreaks



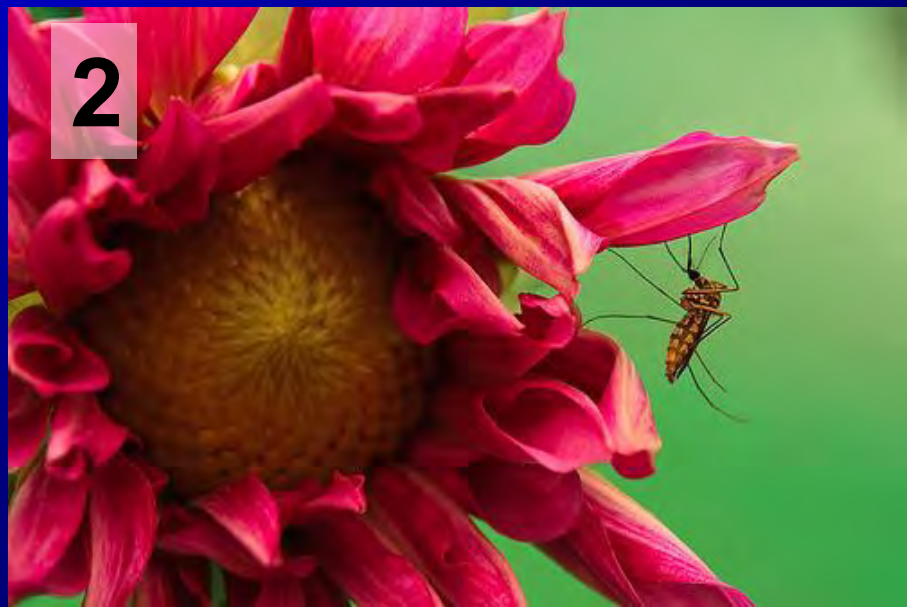
ZIKA Action Plan SUMMIT

CDC Atlanta, GA

April 1, 2016

Recipe for producing mosquitoes

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



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