Zika Virus

A Vector Control Perspective

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Pathogens & Vectors

Bacteria, **virus**, or other disease causing microorganism

Organism/insects/animals that transmits disease from one animal to another

Typically think of ticks & mosquitos (arthropods)

Arthropod Disease / Arbovirus

Ticks/Bacteria Mosquitos/Virus

2 Mosquitos of Concern

- Aedes aegypti
- Aedes albopictus

Only females bite, they need a blood meal to produce eggs (oviposition)

Aegypti

Aegypti

1862 Burial Site of Yellow Fever Victims (Oakdale Cemetery)

- Communal burial site of approximately 400 people who died between September and the frosts of November 1862
- Wilmington's population was approximately 10,000
- About half fled the city
- Of the 1,505 reported cases, 654 (43%) died of yellow fever

Albopictus (Asian Tiger)

Albopictus

Asian Tigers

- **Means of Introduction**: Arrived accidentally in used tires imported from Japan in the middle 80's

- **Impact**: Has aggressive daytime human-biting behavior and ability to vector many viruses, including West Nile virus Chikungunya, Dengue Fever, and now suspected Zika Virus

Comparison

Aegypti & Albopictus distribution

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

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

*Maps were developed 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.

March 22, 2016

Public Health

HEALTH AND HUMAN SERVICES

The mosquitoes responsible for most Zika virus transmission are not believed to be widespread in North Carolina

Washington Post

April 29th,2016

"There are officials who have been saying we don't have *aedes aegypti*, so we don't need to be worried or have a plan," said Janet McAllister, an entomologist at the U.S. Centers for Disease Control and Prevention. "What CDC is saying is: You need a plan in place because albopictus could transmit Zika in your area, and you need to take it seriously."

Washington Post

April 29th,2016

For the first time in the Western Hemisphere, researchers have detected the Zika virus in *Aedes albopictus*, the mosquito species known as the “Asian tiger,” a finding that increases the number of U.S. states potentially at risk for transmission of the disease.

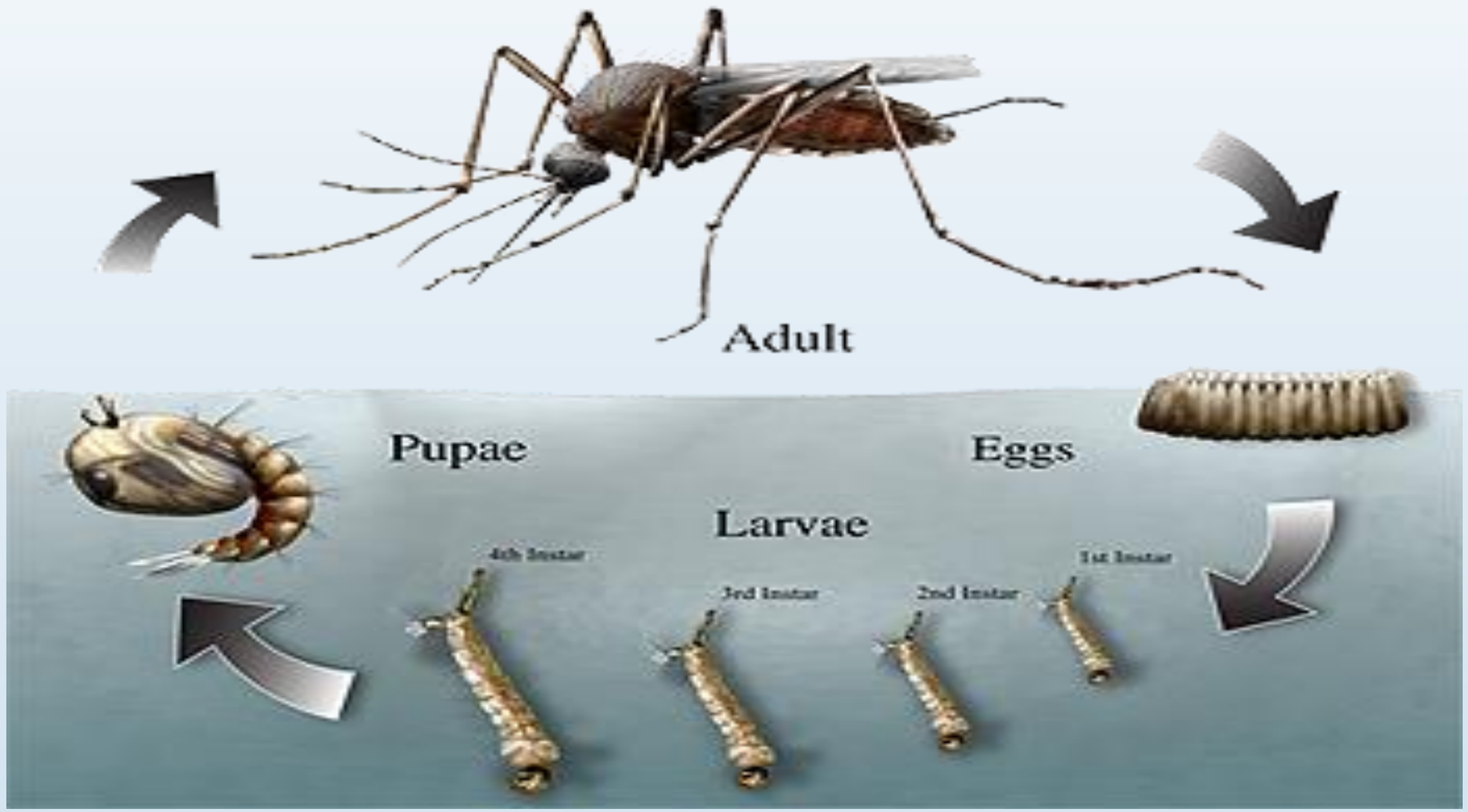
Key Tiger Characteristics

Container breeders/ankle biters

Don’t travel far

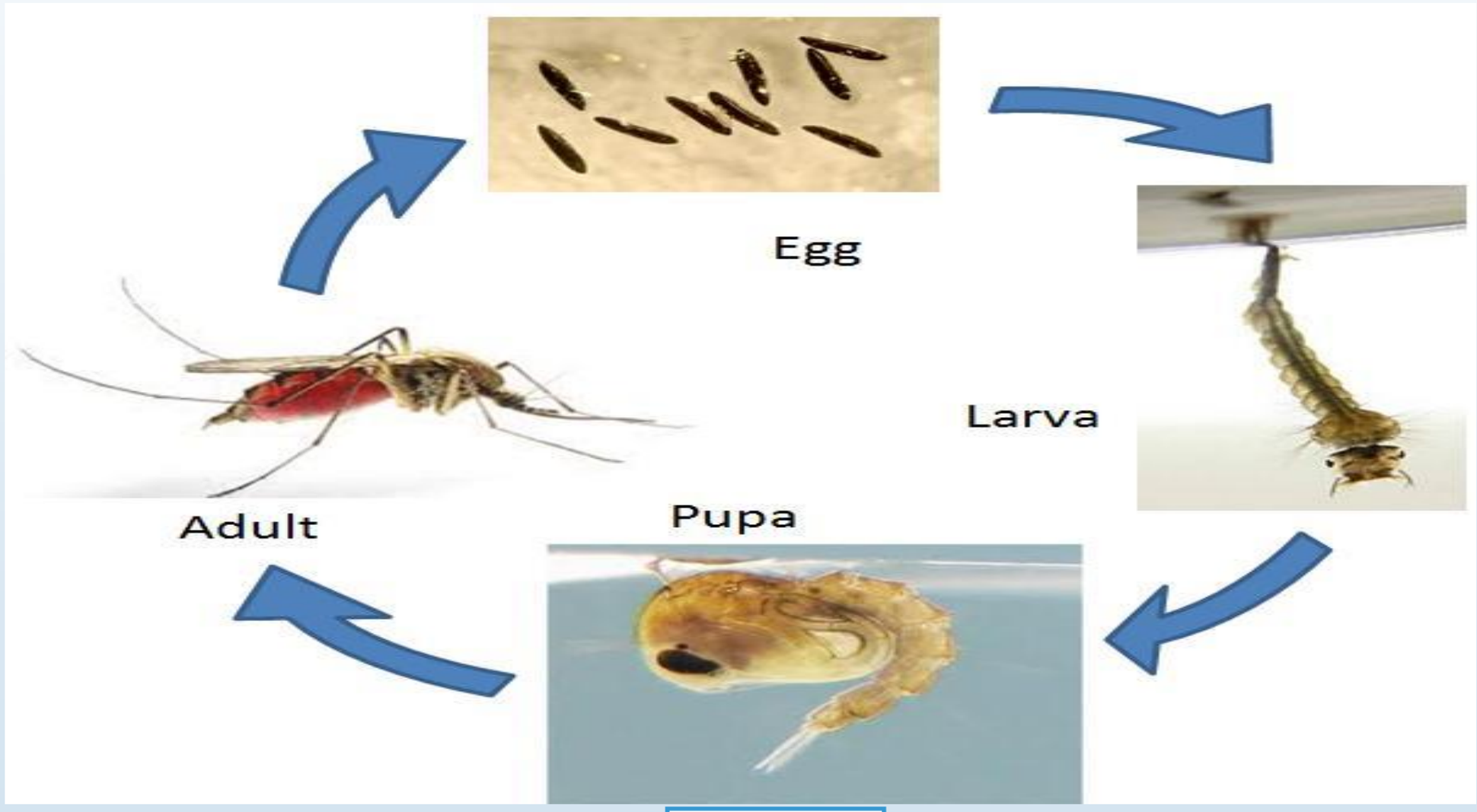
Active during daylight, not night

Mosquito Life Cycle



Life Cycle

Water!



NC Vector Control

aka PHPM

- In 1957, the North Carolina General Assembly established the Salt Marsh Mosquito Study

- Mosquito & Vector Control program began / General Statute 130A-346 through 349

- **2011 was abolished and repealed by Session Law 2011-145, s. 13.3(j).**

County Level

Traditionally falls to ENVIRONMENTAL HEALTH

Integrated Pest Management

Will now be known as

Integrated Vector Management

Vector Control Program Basics

- Education
- Surveillance: Complaints, Trapping, Dipping (larvae collection), Identification
- Larviciding: Surfactants, hormone inhibitors, bacteria like BTI (bacillus thuringiensis
- Adulticiding: Permethrin based spray with ULV spraying equipment

Education: ***Tip and Toss***

- Most basic but most effective means of combating Asian Tiger Mosquitos
- Catchy phrase that kids love to repeat

Surveillance

- Complaints
- Dipping
- Trapping

Dipping Larvae

Rearing Chambers

Larviciding

- Surfactants
- Hormone inhibitors
- Bacteria like BTI (bacillus thuringiensis)

Surfactants & Larviciding

Surface tension

Trapping

- CDD Light Traps
- Gravid Traps

Surveillance

CDC light traps utilize dry ice (CO_2) and light (IR signature)

Gravid Trap

Incorporates “stink” water/oviposition

Why Surveillance?

- Confirm Species of Concern

- Confirm Numbers / Action Threshold Levels

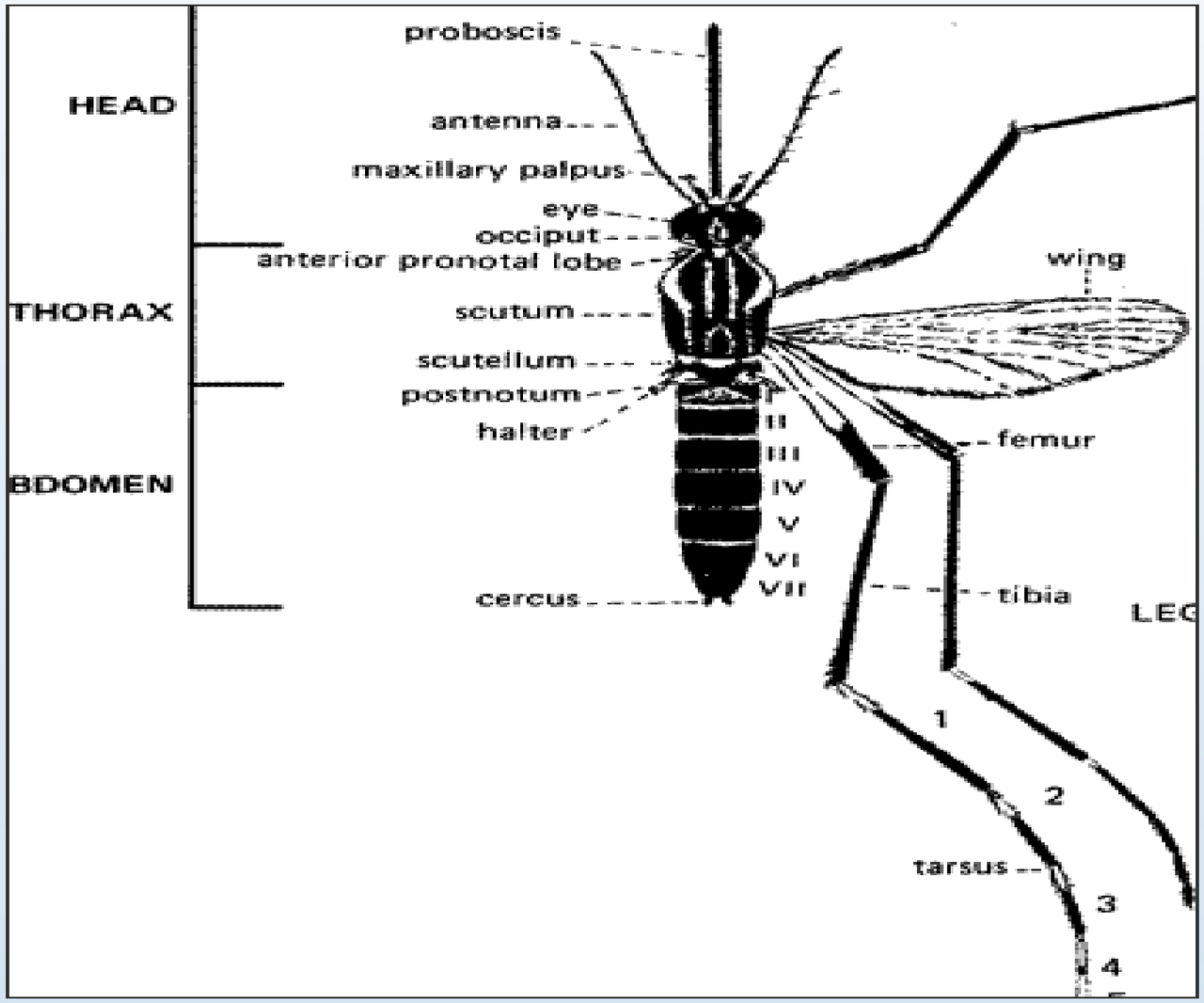
Identification

- http://www.mosquitocatalog.org/files/pdfs/123180-0.PDF

A Key to the Mosquitoes of North Carolina and the Mid-Atlantic State

Key to the Genera & Species of Adult Females

Anatomy


HEAD
THORAX
BDOMEN
proboscis
antenna
maxillary palpus
eye
occiput
anterior pronotal lobe
scutum
scutellum
postnotum
halter
cercus
II
III
IV
V
VI
VII
wing
femur
tibia
LEG
1
2
tarsus
3
4

Traditional ULV Spraying

Re-cap

- Aedes albopictus is capable of transmitting viruses
- It is a container breeder (tip & toss, clean up)
- Does not travel far (usually stays within 500 feet)
- Very aggressive (may bite up to 10 times & is very quick/nervous so is hard to kill)
- Active in daytime so traditional ULV spraying is not an option

To Date:

- Letter & Educational flyers to Tire Dealerships
- Working on PSA w/Bs&GsC
- Info on HD Lobby TVs
- Info and Education Child Day Cares
- Brochures in Septic System Packets
- Larvicide & Repellent PH Day & After
- Hand Fogger & Pesticides
- Quotes from Private MC Companies
- Public Health Day (staff suggestions)
- Flyers to City NI & Code Enforcement
- Clean Sweep Initiative / city
- Home Owners Association

Questions