MOSQUITO CONTROL IN ATHENS-CLARKE COUNTY

PROGRAM PURPOSE

Control the mosquito population in Athens-Clarke County with minimal impact on the environment & health of our citizens

MOSQUITO CONTROL HISTORY IN ACC

- Previous program mainly a part-time seasonal employee. Adulticide spraying. Cancelled in 1997.
- In 2003, new program debuted, overseen by ACC Manager's Office.
  - ACC offices: Public Information Office, Fire & Emergency Services, Human Resources, Solid Waste, Transportation & Public Works, Human Resources, Community Protection Division
  - UGA (Department of Entomology)
  - Clarke County Health Department

MOSQUITO CHARACTERISTICS

- All require water to develop
- Adults long-legged
- One pair of wings
- Long proboscis
- Worldwide distribution
- Adapted to a variety of habitats
- ~160 species in U.S., over 60 in Georgia

MOSQUITO-BORNE DISEASES

- Mosquitoes can transmit:
  - West Nile Virus (WNV)
  - Eastern Equine Encephalitis (EEE)
  - La Crosse Encephalitis (LAC)
  - Malaria
  - Dengue fever
  - Zika
  - Heartworms

ASIAN TIGER MOSQUITO

- Most common biter & nuisance mosquito in Athens is *Aedes albopictus*
- The **“Asian tiger mosquito.”**
- Imported into Houston, TX in 1985
- Black with distinct white bands
- One of Georgia’s most common urban pests

- Container breeder, commonly found in tires


UGA1366026

ASIAN TIGER MOSQUITO

- Limited flight range (~300 feet), not a strong flier
- Most active in early morning & late afternoon. More of a daytime problem
- Primarily a nuisance species in Georgia, not really a disease vector
- Commonly an ankle biter
- Persistent & aggressive
- Difficult to control with normal adulticide applications, education important


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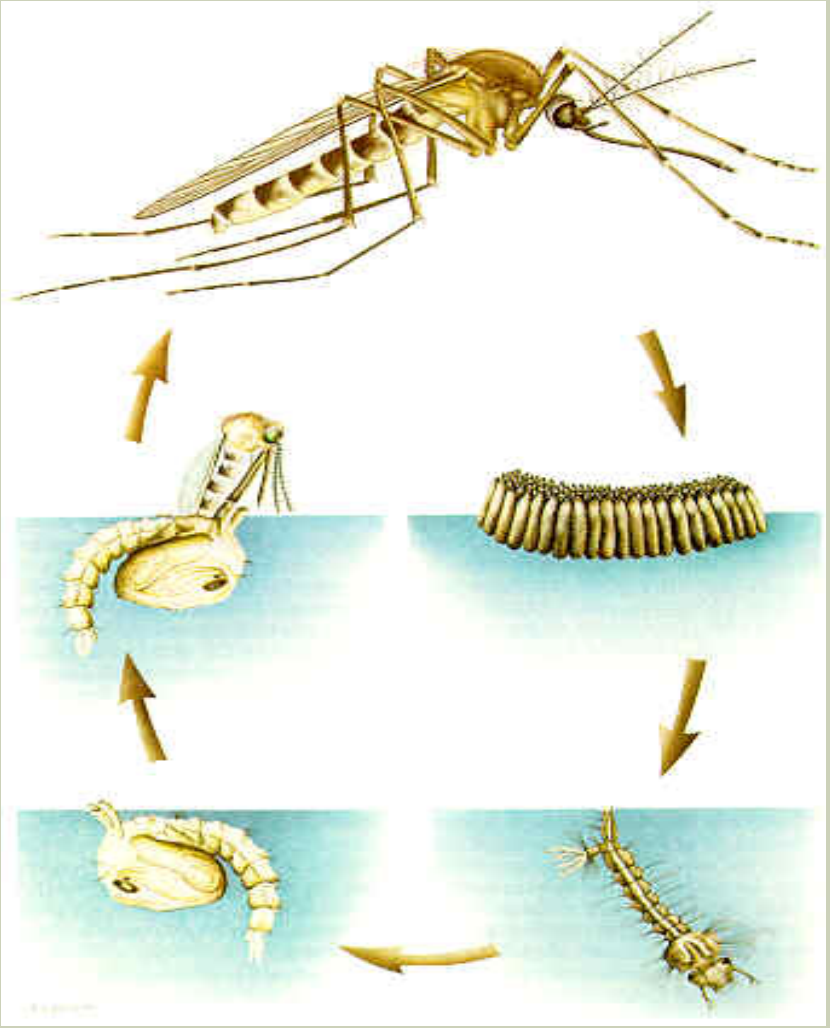
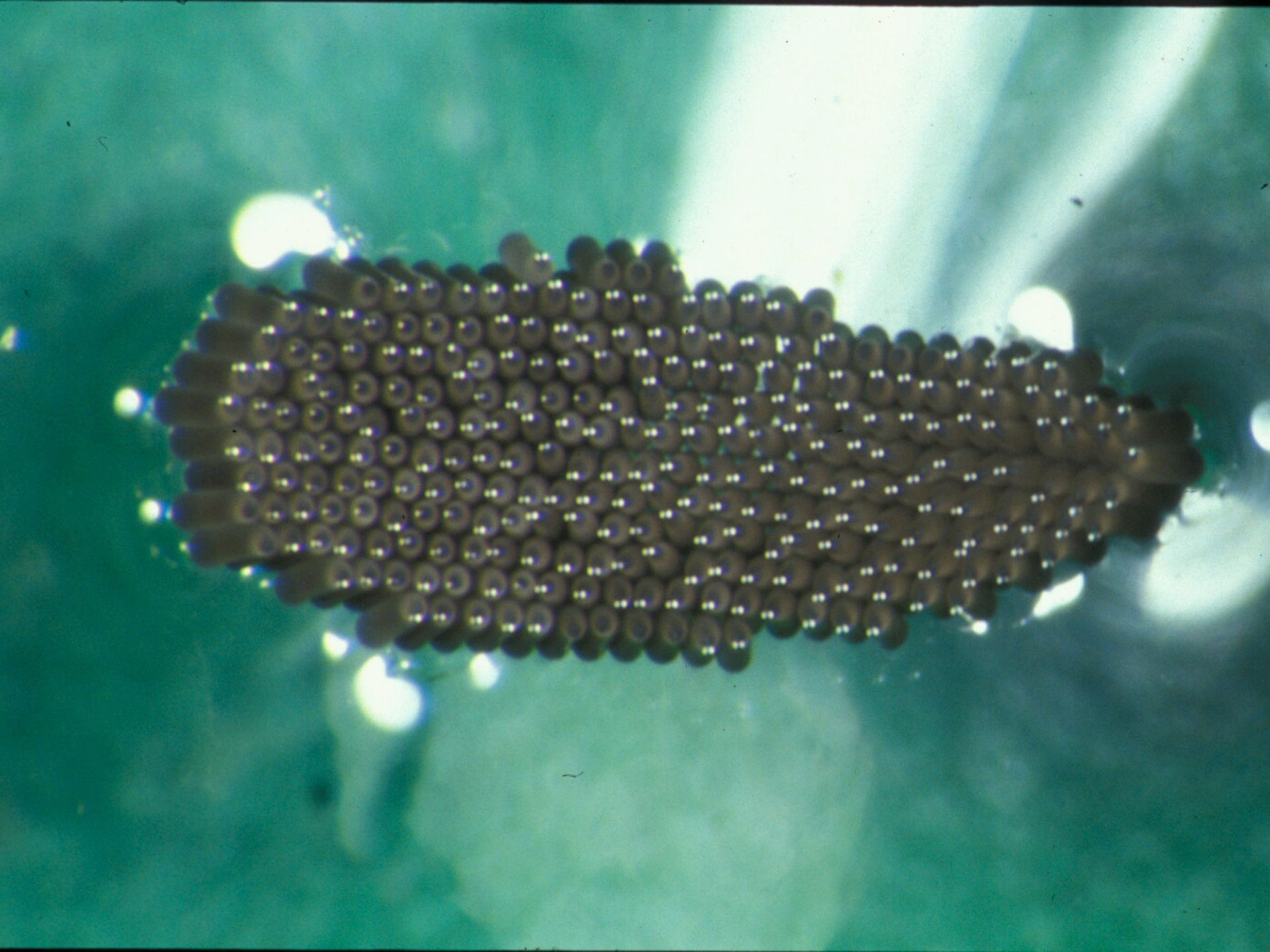
MOSQUITO BIOLOGY

- 4 distinct life stages: egg, larva, pupa & adult
- Eggs – In rafts or single, can hatch in 24-48 hrs.
- Larvae – Feed on micro-organisms & organic matter
- Pupae – Non-feeding
- Adult – emerges onto water surface, many do not fly far
- Cycle – 6 days to months
- Life span – 0.5 to 6 months



EGGS – STAGE 1

- Females lay 100-150 eggs. Multiple cycles in a life.
- 2-5 days of incubation before hatching
- Eggs laid in permanent water (ponds, pools, etc.) will hatch after incubation
- Eggs laid in tree holes, containers, ditches, or floodwater areas will hatch after incubation when inundated with water
- Most eggs are very resistant to environmental conditions such as freezing
- Some eggs may remain viable up to 4 years



LARVAE – STAGE 2

- Commonly called **“wigglers”**
- Develop in 3-7 days. Depends on food & temperature.
- Most are filter feeders – don’t bite
- Live in water
- Breathe air, but can absorb oxygen though the body wall
- Quickly dive from surface of water when disturbed
- Surveillance first step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LARVAL HABITAT – STAGE 2

- Stationary or very slow moving water
- Suitable food source available: bacterial, fungal, algal, or suspended organic particles
- Provides protection from wind & waves
- Protection often provided by emergent vegetation
- **Any** item that will hold water – CRITICAL
- Habitats particular to individual species

PUPAE – STAGE 3

- Commonly called **“tumblers”** describing movement through water column
- Do not feed (bite), but do breathe at water surface
- Live in water
- Typically a short stage in life cycle: 2-3 days
- Adults will emerge soon
- Do not feed – control options limited


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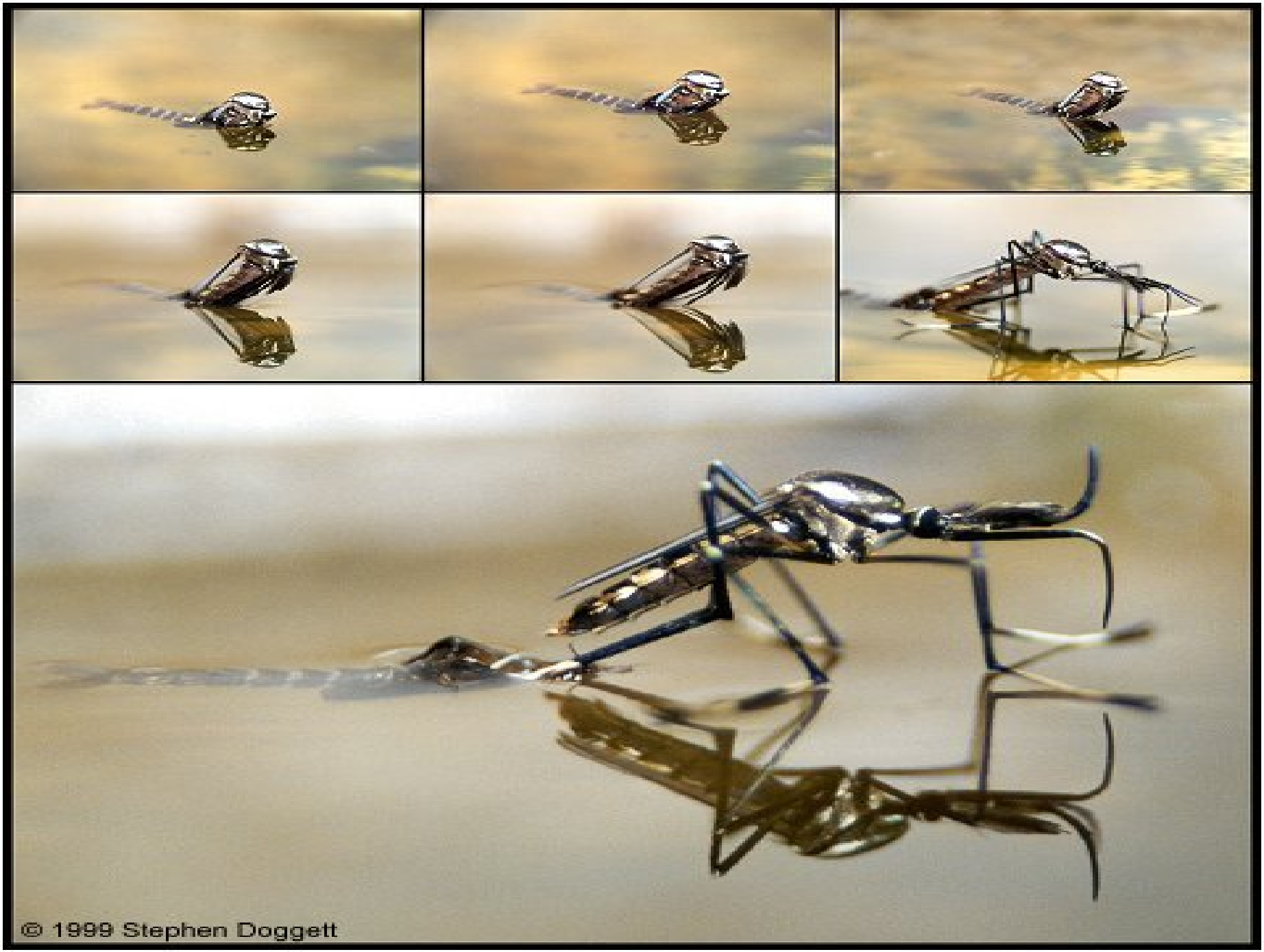
ADULTS – STAGE 4

- Adults after 1-2 weeks total (all 3 stages)
- Pupae lighter than water due to internal air bubble
- Skin splits
- Adult rests on the water's surface until body dries & it's exoskeleton hardens
- A still, protected area is critical for them
- Excessive wind & wave action will drown adults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ADULTS – STAGE 4

- Males & females feed on nectar
- Mate soon after emerging
- Only females bite
- ~3 days after a blood meal, eggs ready to be laid
- Most live about 2 weeks, but some may live 2 months or more

MOSQUITO LIFE CYCLE RECAP

- Eggs laid on water with some biological activity or on areas that will become wet
- Egg to adult in 6 days under ideal food and temperatures (hot), seldom less
- Adults don’t typically fly far, there are exceptions
- Cycle driven by temperatures and food availability
- Populations typically build through summer

MOSQUITO HABITATS

- Develop in a wide variety of habitats
- All have some version of standing water eventually
- Each species typically prefers a specific type habitat: containers, flood water, permanent water, tree-holes
- Choice of larvacide oriented to the type site being treated

MOSQUITO CONTROL

- Most effective way to control mosquito populations is to **eliminate larval habitats**.
- Spraying to kill adult mosquitoes is *not* the most efficient course of action.
- A major component of the ACC Mosquito Control Plan is public education about eliminating larval habitats.
- The ACC Public Information Office has created a detailed summary flyer & an informational brochure that includes tips for controlling mosquitoes.

INTEGRATED PEST MANAGEMENT

- Education/Communication
- Surveillance
- Source Reduction
- Larvaciding
- Adulticiding

INTEGRATED PEST MANAGEMENT (IPM)

- Combines tools such as insecticides, parasites, mechanical methods, biological & habitat modification.
- Adulticides may be used, but only after systematic monitoring of pest populations indicates a need.
- Considers all available control actions, including no action.
- The ACC IPM system includes surveillance, personal protection, education, habitat modification, biological control, larvacides, & possibly adulticides

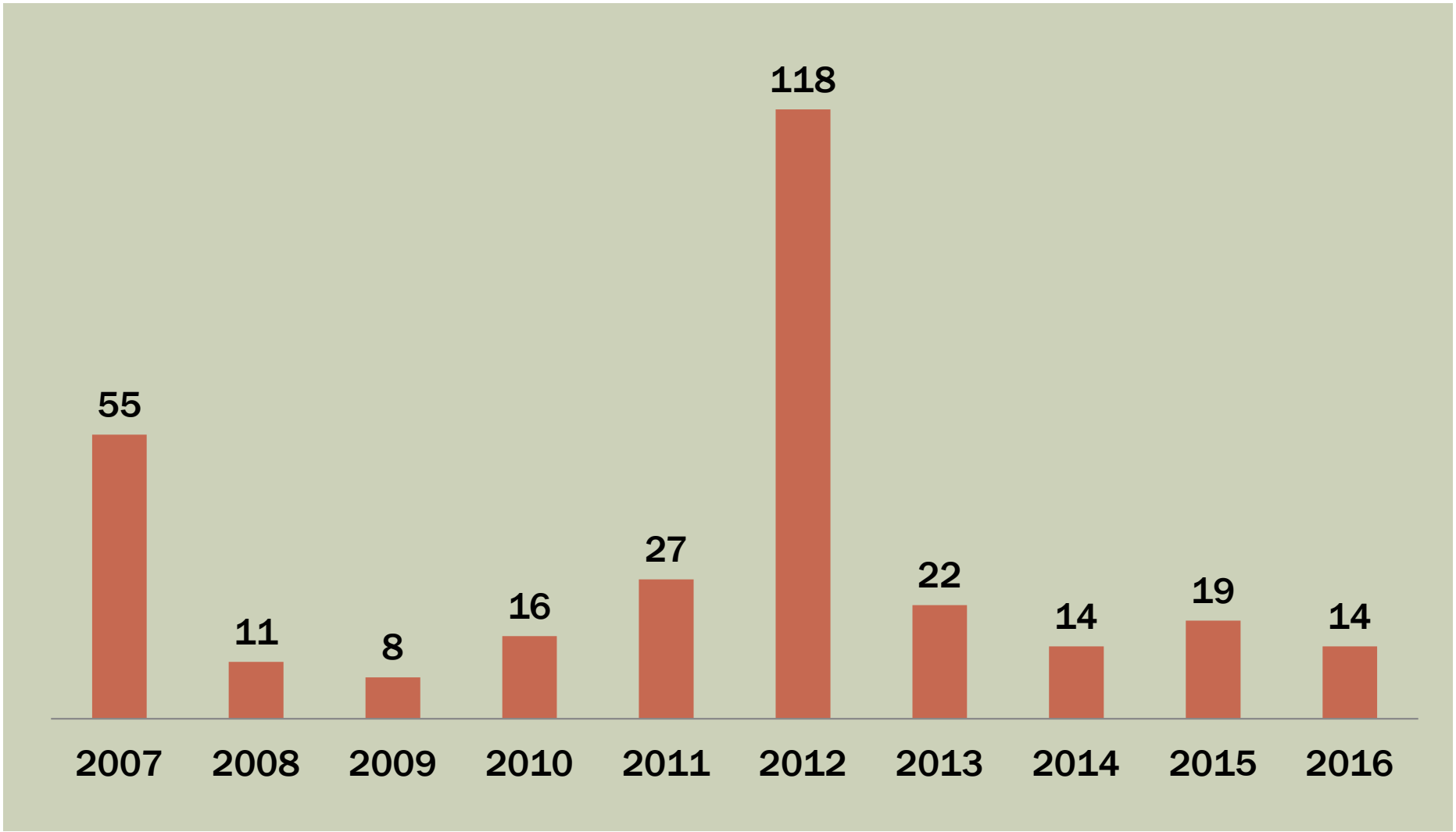
WEST NILE VIRUS (WNV)

- Georgia's main WNV vector, *Culex quinquefasciatus,* does well in drought situations as it lays eggs in stagnant, organically-polluted water.
- Areas with heavy rainfall occurring at least every 7-10 days should see fewer WNV+ mosquito pools, as the mosquito larvae are flushed from the larval habitat
- Four WNV cases in Athens since 2003 (2007 & 2016 - 3)

WEST NILE VIRUS

- **Odds of getting a mosquito-borne illness from a mosquito bite in Georgia are extremely low.**
- Even in areas where mosquitoes are known to carry WNV or other viruses, very few mosquitoes will actually be infected and capable of transmitting the viruses to humans.
- Even if an infected mosquito bites you, your chances of becoming ill are very low.
- Less than 1% of humans infected with West Nile virus will develop serious illness.

Human Infection Surveillance by County (All Counties)
Georgia Division of Public Health



2016 DISEASE SUMMARY

- 14 infections reported
- Georgia population (2016) = ~10.4 million
- 13 cases of WNV (3 in Athens)
  - 2 found through blood donation testing, 1 by fever
- Athens-Clarke County population (2016): ~125,000
- 1 of Eastern Equine Encephalitis (EEE)
- 113 cases of Zika from travel-related in Georgia
- 0 cases of Zika from local transmission of mosquito to human

PUBLIC/PRIVATE AREA REPORTS

- ACC Public Information Office receives calls
- ACC Trans. & Public Works handles public property areas of concern
- ACC Code Enforcement Division checks areas reported for concerns such as dumping
- UGA Entomology & ACC Public Information Office may conduct site visits as well
- If needed, Clarke County Health Department consulted for adulticide (spraying)
- Spraying has not been done since mid-90's

BIOLOGICAL CONTROLS

- Used for standing water that cannot be removed
- Mosquito fish in certain ponds, lakes, retention ponds
- Can be transferred to other locations by UGA Entomology
- Natural areas such as Sandy Creek Nature Center & Greenway left to natural habitats

LARVACIDE

- Used for standing water that cannot be removed
- Tablet, pellet, granular & briquette formulations of larvicides are also applied by mosquito controllers to breeding areas
- ACC staff uses larvacides in public areas
- *B.t.i.* briquets available at home & garden centers

LARVACIDE BRIQUETS

- *B.t.i* also has been used for over 15 years without incurring resistance in mosquito populations or posing an undue safety risk in humans
- Also safe for use in fish ponds
- 1 briquet covers 100 square feet for one month (surface area)
- Use in rain barrels
- Can be broken into pieces for smaller applications over time

ADULTICIDE

- Adult mosquito control may be undertaken to combat an outbreak of mosquito-borne disease or a very heavy nuisance infestation of mosquitoes in a community.
- ACC recommends adulticides to be used only when there is a clear and assessed need determined by ACC Mosquito Surveillance Team due to an outbreak of mosquito-borne disease or a very heavy nuisance infestation of mosquitoes.

TIPS

- Eliminate standing water.
  When in doubt, dump it out.
- Use larvacide briquets from stores for water that cannot be eliminated.
- Dispose of any refuse that can hold water, especially tires.
- Almost anything that can hold water for a week - even a chip bag - can hold mosquito larvae.
- Situate boats & wheelbarrows so that they don't hold water

TIPS

- Rain barrels may need larvacide briquets in them if insect screening / sealing is not used on openings.
- Check tarps & covers that may collect water.
- Change water in plant containers and birdbaths at least weekly.
- Check areas and items after rain for standing water.
- Maintain gutters, roofs & drainage ditches
- Make sure window & door screens are intact

TIPS

- Remove or trim excess vegetation such as ivy to eliminate adult mosquito resting areas
- Stay indoors at dawn, dusk, and early evening when mosquitoes are most active
- Wear long sleeves, long pants, shoes & socks when outside
- Mosquitoes are less attracted to light-colored clothing
- Fill tree-holes with sand or mortar

TIPS

- Ultrasonic devices & traps have not been shown to provide a noticeable mosquito reduction
- Backyard foggers may be helpful if needed, but avoid misters that can be scheduled
- If any devices are used, continue using repellent & reducing standing water
- Keep pets indoors at dawn, dusk, and in the early evening; don’t apply mosquito repellent to animals
- Sit by a fan to repel mosquitoes; they don’t like strong winds

REPELLENTS

- **Use insect repellent**. Products containing DEET, Picaridin, or oil of lemon eucalyptus are recommended by CDC – EPA registered products.
- Permethrin - clothes only.
- Products with 10-30% DEET can be used on children over 2 months old (avoid their hands)
- Higher % of DEET provides longer protection, but those >30% do not provide much added protection. Use according to directions (10%=2 hrs., 24%= 5 hrs.)
- Repellent can be used with sunscreen

CONTACTS

- www.athensclarkecounty.com/mosquito
- ACC Public Information Office
  706-613-3795 (Jeff Montgomery)
- ACC Code Enforcement Division
  706-613-3790
- ACC Transportation & Public Works
  Streets & Drainage Division
  706-613-3465 (Kevin Gentry)
- UGA Department of Entomology
  706-542-1184 (Elmer Gray)