GMCA – 2024

Session 1

A. AMCA Washington Day – Natasha Agramonte
    a. Advocacy vs lobbying
        i. Advocacy – educating and raising awareness
        ii. Lobbying – direct communication to change views
    b. https://www.mosquito.org/washington-conference/
    c. Important to do post conference follow-up
    d. Key Issues
        i. America Needs Mosquito Control
        ii. Drones
B. Cheese as an Unconventional Mosquito Attractant – Dan Peach
    a. Knols and De jong – Limburger Cheese as an Attractant
        i. It smells like feet
        ii. Analyzed the volatiles in a follow-up study
        iii. Won 2006 Ig-Nobel Prize - https://improbable.com/2017/06/29/stinky-feet-and-cheese-researchers-research-gets-new-attention/
    b. What does attract mosquitoes
        i. Aged sweat, not fresh
            1. Microbes on skin
            2. Only mammals possess sweat glands
        ii. Making cheese
            1. Dates back to at least 5500 BCE
            2. Add microbes to milk
            3. Many of the microbes are related to skin microbes
            4. At least 500 varieties of cheese are recognized
                a. Soft
                b. Aged
        iii. Hypothesis – let's try other cheeses
            1. Mosquitoes
                a. *Culex pipiens*
                b. *Aedes aegypti*
            2. All varieties of cheese attracted both species
            3. Field study
                a. Attractants
                    i. Cheese – brie
                    ii. CO2 trap
                b. Mosquitoes captured
                    i. *Cx pipiens*
                    ii. *Culiseta incidens*
            4. What about oviposition?
                a. Casu Martzu
                    i. Produced using maggot fermentation
                    ii. Eat the live maggots with the cheese
                b. Cheese infusion
                    i. Brie, raclette, or Limburger cheeses
                    ii. Sit for 5 days in water

        c. Only the *Culex pipiens* ovipositor in the different cheese infusions in the lab
        d. Field
            i. Tested cheese against grass infusion
            ii. Brie infusion was twice as attractive as the hay infusion
    5. What about homemade cheeses?
        a. Used different starter microbes
        b. Results
            i. One was attractive
            ii. One was repellent
            iii. One was indifferent
    6. Interesting aside
        a. Got egg rafts in the field
        b. Didn't see larvae
        c. Maybe there is a larvicidal property, but why?
        d. Needs more study
    7. Next steps
        a. Customize too optimize attraction
        b. Possible CO2 production
        c. Larvicidal property
    8. https://scijournals.onlinelibrary.wiley.com/doi/abs/10.1002/ps.6603
C. Entomological Approach for Industry – Emma Grace Crumley
    1. Mosquito Squad
        a. Headquartered in Macon, GA
        b. National franchises
        c. Use an IMM approach
        d. Balance between environmental stewardship and client satisfaction
    2. IMM approach
        a. Do inspection
        b. Source reduction
            i. Intentional
            ii. Accidental
            iii. Water features
            iv. Flood/pooling areas
        c. Identification
            i. Listening to customer
            ii. Identify pest
            iii. Understand process
        d. Communication
            i. Understand sensitive locations
            ii. Other issues
        e. Mechanical control
            i. Educate customer
            ii. Trimming back vegetation
        f. Chemical control
            i. Larvicide

            ii. Barrier spray
        3. Surveillance tools
            a. Customer feedback
            b. Google alerts
            c. NOAA info
            d. ArboNET
            e. Driftwatch
            f. Beecheck
        4. Entomologist's job
            a. Review trainings
            b. Create educational content
            c. Answer questions
            d. Blogs/social media
            e. Community engagement

D. Inhibition of Emergence – Mike Riles
    a. Overview
    b. Methoprene is a juvenile hormone analog
    c. Works in parts per billion range
    d. Prevents successful molting to adult stage
    e. Ingestion & absorption
    f. Product
        i. Highly volatile
        ii. Breaks down under UV
        iii. Use microencapsulation to provide slow release of product
    g. Insect growth Regulation
        i. Juvenile hormone regulated by ecdysone
        ii. Highest in earliest larval stages
        iii. Decreases with time
        iv. Methoprene keeps jh high in pupal stage
    h. Modes of Action
        i. Ingested through filter feeding
        ii. Absorbed through cuticle
    i. Inhibition of Emergence
        i. IE (%) = (C-T/C) x 100
            1. C - % emerging from control
            2. T - % emerging from treatment
        ii. Assessing Success
            1. Qualitative
                a. Sample from random sites
                b. Sample from controls
            2. Troubleshooting
                a. Assess the application
                    i. Application rate
                    ii. Environmental factors
                    iii. Water quality
                b. Mechanic of application – calibrate often
                c. Wind speed
                d. Target missed

            e. Human error
        iii. What is impeding success?
    j. Reflections
        i. Only collect pupae
            1. JH at lowest level
            2. S-methoprene at high levels
        ii. Larvae have high levels of JH

E. Georgia's Pesticide Resistance Testing Program – Tiffany Nguyen
    a. Insecticide resistance
        i. Product doesn't work or only partially works
        ii. How
            1. Lack of calibration
            2. Improper application
            3. Using product for too long
        iii. Types of resistance
            1. Metabolic
            2. Target site
            3. Penetration
            4. Behavioral
            5. Cross-resistance
        iv. Bottle bioassay - https://www.cdc.gov/mosquitoes/php/toolkit/cdc-bottle-bioassay.html
    b. Process
        i. Collect eggs – we collect *Aedes albopictus* and *Culex quinquefasciatus* primarily
        ii. Rear eggs to adult stage
        iii. Test using bottle bioassay
            1. Diagnostic time
            2. Diagnostic dose
            3. End after 2 hours
    c. Using technical grade pesticide, not pesticides used by control programs – points to potential developing resistant
    d. Interpreting results
        i. Lab vs field studies
        ii. Technical grade active ingredients vs commercial products
        iii. Developing resistance does not mean the product doesn't work
    e. Managing resistance
        i. Follow label
        ii. Calibrate
        iii. IMM
        iv. Rotate chemicals
        v. Leave untreated refuges

F. INDUSTRY SPOTLIGHT
    a. AZELIS – Dan McCombie
    b. AMVAC – Derek Wright
    c. Central Life Sciences – Mike Riles/Dan Killingsworth
    d. Target – Steve Molnar

G. Georgia EPD's Tire Management & Abatement Program – Lena Sassone

a. Programs dealing with tires (https://epd.georgia.gov/about-us/land-protection-branch/recovered-materials-and-abatement/tire-management)
    i. Recovered Materials Unit – tire abatement
    ii. Tire Management Unit – regulatory
b. TMU deals with registration, permits, complaints, and control
c. Recovered materials unit
    i. STAR program
        1. Funds annual tire day
        2. Reimburses local government scrap tire abatement projects
        3. https://epd.georgia.gov/about-us/land-protection-branch/recovered-materials-and-abatement/recovered-materials/star-grant
        4. For info - EPD.star@dnr.ga.gov
        5. Work with Keep Georgia Beautiful to put in application
    ii. 8 tire recyclers
    iii. Tire products grant
    iv. Recycling and waste diversion grant
    v. State-led abatements
        1. Unresolved or emergency response
        2. Property owner is unable to remove tires or was the victim of dumping
d. Solid Waste Trust Fund
    i. Established in 1990s
    ii. Part of the Georgia Comprehensive Solid Waste Management Act
    iii. Recent amendment (2022) allocated all trust fund fees to their allotted program

H. Alpha-Gal Syndrome: Tick Bite Induced Red Meat Allergy – Nancy Hinkle
a. Georgia has 23 tick species
b. Red meat allergy associated with lone star tick bites
    i. External hives
    ii. Internal (GI tract) hives
    iii. Anaphylaxis
c. Allergic reaction typically occurs 3 to 8 hours after eating red meat
d. Tick bite is not associated temporally with the allergy
e. Number of tick bites before allergic reaction varies
f. Allergy
    i. Reaction to a sugar - galactose-alpha-1,3-galactose ("alpha-gal")
    ii. All animals except higher primates and human produce this sugar
    iii. Delayed hypersensitivity reaction
    iv. Seems to be blood type dependent
g. Lone star tick
    i. Feeds on a wide range of animals
    ii. Range is expanding
h. Treatment is symptomatic, avoidance of tick bites is key
i. Protection
    i. Permanone on clothing
    ii. Tuck your pant legs into your socks
    iii. Wear repellent containing DEET

Session 2

A. Locally-Acquired Malaria in the 21st Century: Searching for Vectors – Becca Love
    a. Background
        i. *An crucians* shipped for testing from Florida
        ii. Historically, *An quadrimaculatus* are the SE USA malaria vector
    b. Study areas
        i. Heavily wooded
        ii. Big trees
        iii. Water close by
    c. Trapping
        i. CDC light traps
        ii. Resting boxes
    d. Study sites
        i. Decatur
            1. Found all 3 common *Anopheles* species
            2. Water levels appear to predict *An crucians* but not *An punctipennis*
            3. Most mosquitoes caught in light trap
            4. Caught very few *An quadrimaculatus*
            5. Never caught An crucians in resting traps
        ii. Valdosta
            1. Small spike of quads early on
            2. Most mosquitoes caught in light trap
        iii. Sarasota
            1. Found *Anopheles* in the resting boxes
            2. Changed the resting trap design
    e. Next steps
        i. Cold-weather sampling
        ii. Different sampling techniques
        iii. Molecular ID to differentiate sibling species
        iv. Population genetics
B. Using UAS with Fieldseeker GIS Software and ArcGIS Online – Chad Minteer
    a. Using unmanned aerial systems (UAS)
        i. Automated treatments
        ii. Mapping
        iii. Inspections
    b. Automated treatment drones
        i. Reach hard-to-reach areas
        ii. Enter dangerous areas
        iii. Treat areas too small for aircraft
    c. Becomes a very useful tool when used with Fieldseeker and ArcGIS Online
        i. Allows use of your own data
        ii. Data can be shared with drone
    d. Fieldseeker
        i. Integrates with ArcGIS Online
        ii. Can review and export proposed treatment areas
        iii. All known data about the area can be shared

iv. Treatment information can be added manually or imported
e. All data can be brought together and mapped on ArcGIS
f. Mapping
i. Orthomosaic image
ii. ESRI also has software for using drone data
iii. Can create image layers
g. Inspections
i. Part of Drone2Map Advanced
ii. Export data as a report or map data
iii. Can add imagery layer to ArcGIS Online (oriented imagery)

C. ReMoa Tri, A New Active Ingredient for Mosquito Adulticiding – Katie Williams
a. Resistance issues
i. More than 500 species worldwide are resistant to current pesticides
ii. KDR and metabolic resistance or common
iii. Lots of resistance to pyrethroids
b. New products are needed – ReMoa Tri
i. 3 modes of action
1. Abamectin
a. Same family of ivermectin
b. Different mode of action than used before in mosquito control
2. Fenthropathein – type 2 pyrethroid
3. C8910
a. Mixture of 3 fatty acids
b. Acts as an insecticidal soap
ii. Based on fermenting soil bacteria
iii. Oil-based
iv. Non-corrosive
v. Look at results after 24 hours
vi. Labeled for aerially and for ground in Georgia
vii. ULV
viii. Ready-to-use
c. Field trials
i. Arizona – truck spray
1. *Culex* spp mix
2. Over 90% mortality seen
ii. California – backpack sprayer
1. *Culex quinquefasciatus* resistant strain
2. Over 90% mortality seen
iii. Florida
1. *Aedes aegypti* – resistant strain
2. Good results
iv. Other sites around the US and Puerto Rico
v. Tanzania – resistant *Anopheles* spp

D. Development of a Black Fly Repellent Testing Protocol – Skyler Kerr
a. Flies
i. Autogenous species
ii. Sexually dimorphic

iii. Utilize post-ovipositor females
iv. Phototaxic positive

b. Attraction cues
    i. 7 major cues
    ii. 3 top cues
        1. Visual
        2. Thermal
        3. Chemical
    iii. Used in study
        1. Thermal
        2. Visual
        3. Gustatory and olfaction

c. Repellent selections
    i. DEET
    ii. IR3535
    iii. PMD
    iv. Oil of lemon eucalyptus
    v. Picaridin

d. Testing system
    i. Water-jacketed feeding membranes
    ii. Apply repellent to membrane
    iii. Observe feeding rates
    iv. Attractant is sucrose

e. Process
    i. Aspirate 40 females into cups
        1. Latex membrane on top
        2. Clear plastic on bottom
    ii. Attractant – sucrose
    iii. Repellent added to membrane
    iv. Count how many flies are feeding
        1. 5-minute count
        2. Conducted once every 2 hours for 12 hours

f. Trials
    i. Dosage variation
        1. Use publicly available product
        2. Multiple replicates
    ii. Find standard DEET percent
        1. Non-coverage is an issue
        2. DEET dissolves plastic, which is a problem with this system

g. Future directions
    i. Work on repellent concentrations
    ii. Try some new repellent types
    iii. Dissect flies to be sure they actually laid eggs
    iv. Color sucrose?

E. Characterizing the Resting Behavior of *Aedes aegypti* to Advance Vector Control – David C Jimenez-Vallejo
    a. Semi-field perspective
    b. Typical control

i. Dengue control
ii. Typically, rest inside houses down lower
iii. Targeted insecticide residual spraying
    1. Saves money
    2. Saves times

c. Study
    i. The targeted focus of TIRS shifts the selective force on the mosquito
        1. A fraction of mosquitoes still rest up higher on wall
        2. Will this lead to the development of behavioral resistance as in *Anopheles* spp
    ii. Other questions
        1. Instrinsic
            a. Strain
                i. Rockefeller (lab)
                ii. Marida wild strain (field)
            b. Sex
                i. Males
                ii. Females
            c. Physiological status
                i. Fed females
                ii. Unfed females
        2. Extrinsic
            a. Microclimate
            b. Color attraction

d. Set up
    i. Experimental field huts in the Yucatán Peninsula
    ii. Captured climate in hut at height and over time
    iii. Photonic fence monitoring device – capture flight
        1. Recorded for 2 hours
        2. Aspirate everything that wasn't stuck on sticky traps
    iv. Sticky traps – capture resting
        1. 4 kinds
            a. Fully black
            b. Fully white
            c. Black over white
            d. White over black
        2. 2 meters tall
        3. Measure location of mosquitoes on trap

e. Sampling
    i. Morning
    ii. Middle of day
    iii. Afternoon

f. Results
    i. Both strains primarily flew low
    ii. Field strain primarily rested low
    iii. Preferred black site for resting
    iv. Mosquitoes track microclimate but ignore it in favor of color
    v. Lab strain more variable in response to factors than field strain

F. INDUSTRY SPOTLIGHT
    a. AMVAC – Derek Wright
    b. Clarke – Sidney Brogden
    c. Frontier Precision – Chad Minteer
    d. NDP – Mike Howe
G. Ticks and Tick-Borne Diseases – William Nicholson
    a. Ticks and tick-borne pathogens
        i. Earliest reference to ticks in 1900s
        ii. 1972
            1. 21 species
                a. 4 soft
                b. 17 hard
            2. Wilson and Baker
        iii. Today
            1. 26 tick species
                a. 6 soft
                b. 20 hard
            2. 4 genera of soft species
            3. Genera of hard ticks?
            4. 11 exotic/imported did that have been reported but not established
            5. Asian longhorned tick
                a. Documented as entering US in 2010
                b. Found in Georgia in 2021
                c. Now found in 21 states and DC
                d. Primary concern is to agriculture
    b. Georgia (http://www.gamosquito.org/tick.htm)
        i. Common species
            1. *Amblyomma americanum*
            2. *Dermacentor variabilis*
            3. *Amblyomma maculatum*
            4. *Ixodes scapularis*
            5. *Rhipicephalus sanguineus*
        ii. Trends in TBDs (https://www.cdc.gov/ticks/about/)
            1. Pathogen picked up during feeding
            2. Passed transovariolly
            3. Pathogens
                a. Bacteria
                b. Protozoans
                c. Viruses
            4. Account for >80% of all reported VBDs in US
            5. Ticks are becoming more widespread
            6. TBD incidence has more than doubled in the last 20 years
                a. Some affect from changes in case definition
                b. Only about 10% of cases are reported
        iii. Movement of ticks
            1. Re-establishment of historic areas based on changes in the areas
            2. Tick movement
        iv. AlphaGAL

1. Thompson et al 2023
2. Viracor data
3. 78% of HCP have little to no info about AlphaGAL

v. RMSF

1. Brown dog tick associated RMSF documented from the 1940s
2. Usually associated with *Dermacentor variabilis*

c. Tick survey – Georgia (2016-2019)

i. Looked at areas all over Georgia
ii. Varying amounts a pathogen infection found

d. CDC National Tick Surveillance Program

i. https://www.cdc.gov/ticks/data-research/facts-stats/index.html
ii. Tick surveillance guidelines
iii. Data collected via ArboNET

Session 3

A. Mosquito Flower Power: Determining How Nectar Contents Can Influence Mosquito Vectors – Danica Shannon
   a. Not as much is known about the innate interactions of mosquitoes and the environment
   b. Evidence of nectar feeding affecting pathogens (Richardson et al 2015)
   c. Heavy metal impacts
      i. Have been investigated in larval habitats
      ii. More info is needed about impact on adults through nectar feeding
   d. Hypothesis - the presence of heavy of heavy metals and secondary metabolites in flower nectar will alter infection rates in mosquitoes
      i. Determine what interactions are occurring
      ii. Determine the effect on infection rate and mortality
   e. Also testing Yucatán Peninsula mosquitoes from Prokopec lab
B. GDPH Surveillance Report – Rosmarie Kelly
C. Georgia's FieldWatch Registries – Nick Sumner
   a. Free to use
   b. Georgia is the 25th State to join the project
      i. Rolled out end of July 2024
      ii. New technology
   c. Mapping tools
      i. Driftwatch
      ii. Beecheck
      iii. Fieldcheck
      iv. Cropcheck
      v. Seedfieldcheck
   d. Started at Purdue University in 2008 in response to damage to tomato crops
   e. Fieldwatch
      i. Voluntary
      ii. Only National crop registry
      iii. Public site
      iv. Approved log-in sites
   f. https://fieldwatch.com
      i. UGA Dr Alison Johnson is the data steward (ajohns14@uga.edu)

        ii. Public Service Assistance entomologist
    g. EPA certification & training changes are coming
D. Geosmin as a Safe, Environmentally-Friendly Means of Mosquito Control – Brianna Young
    a. What is it?
        i. Terpene scent class
        ii. Non-toxic to humans
    b. Korean study showed a link between geosmin and serotonin
    c. Affect on insect behavior
        i. At low concentrations if suppresses defensive behavior in honeybees
        ii. Is an attract for fire ants
        iii. Repels gravid fruit flies
        iv. Attractant to gravid *Aedes aegypti*
    d. Mosquito control usage
        i. Attract mosquitoes to traps
        ii. Concentration is critical
        iii. One source – beets
    e. Community involvement
        i. Plastic bottle trap
        ii. Bait with beets and water
E. Medical Entomology in the US Navy – Peter Obenauer
    a. Vector-borne diseases have a high impact on military operations
    b. 1861
        i. Lincoln created the Sanitary Commission
        ii. Led to the Marine Hospital in 1912
    c. Malaria Control in War Areas developed into the CDC in 1946
    d. Navy
        i. World War II
            1. The first Navy entomologists were commissioned in 1941 to address arthropod-borne diseases.
            2. In 1942, Navy Epidemiology Units (NEUs) were deployed to Éfaté, a strategic location in the South Pacific, to support a Marine battalion.
            3. By 1944, there were approximately 200 entomologists in the NEUs.
        ii. Navy Entomology Center of Excellence
            1. The Navy Disease Vector and Ecology Control Center in Jacksonville, Florida was renamed the Navy Entomology Center of Excellence (NECE).
            2. NECE is the Navy and Marine Corps' center of excellence for operational entomology.
        iii. Navy Entomologists
            1. Today, Navy entomologists are mission-critical specialists who support Force Health Protection and Readiness.
            2. They work to prevent and reduce disease and non-battle injuries caused by arthropods.
            3. They also train military and civilian personnel in pest and vector management strategies.
    e. Navy entomologists support the fleet and the U.S. Marines by:
        i. Controlling arthropods that can harm ships and planes, such as cockroaches, bed bugs, and spiders

ii. Providing pest control training to shipboard personnel
iii. Conducting pest management program reviews at shore installations
iv. Providing professional consultation and advice for contingency, disaster relief, humanitarian, and capacity building operations

F. West Nile Virus Surveillance in the Southern United States – Dan Killingsworth
    a. Background
        i. WNV introduced in the US in 1999
        ii. Zoonotic mosquito-borne flavivirus
        iii. Vectors
            1. *Culex pipiens*
            2. *Culex tarsalis*
            3. *Culex quinquefasciatus*
        iv. A Study of the Etiology of WNV in Egypt, 1956
        v. West Nile Virus Story -Dickson Despommier
        vi. CDC WNV Guidelines, 1999
        vii. ArboNET
        viii. Expansion probably due to avian migration flyways
    b. Seasonal peak
        i. Affected by biology of the vector
        ii. Birds
            1. Winter - immunity
            2. Spring – nestlings have partial immunity from mother
            3. Summer – YoY lose immunity
            4. Winter - immunity
        iii. Bird behavior causes a shift in mosquito feeding choices to mammals
G. INDUSTRY SPOTLIGHT
    a. Valent – Katie Williams
    b. VDCI – Pete Obenauer
    c. Veseris – Scott Artman
H. Chatham County Mosquito Control PCR Overview – Tyler Follman
    a. Disease surveillance
        i. Trap mosquitoes
        ii. Identify and sort mosquitoes
        iii. Test mosquitoes
        iv. Decide on action
    b. Prioritize high risk areas
        i. Adjust spray thresholds
        ii. Keep public safe
        iii. Monitor vectors
        iv. Monitor effectiveness of program
    c. Goal – keep *Culex* young
    d. Testing
        i. In-house PCR (started in 2022)
            1. Pros
                a. Quick results
                b. Identify and monitor problem areas
                c. Reliable in a pinch
                d. Allows testing of more species

2. Cons
    a. More work
    b. Targeted virus – WNV, EEE, SLE
    c. Equipment costs & maintenance
    d. Availability of supplies
    e. Space
    f. Results can be difficult to interpret
ii. SCWDS (started in 2001)
1. Pros
    a. Less work
    b. Test for a wider range of viruses
2. Cons
    a. Limited contract
    b. Unreliable timeline
    c. More expensive per sample
    d. Mix-up with results

e. Allows for verification of results
f. Going forward
    i. Test chicken blood
    ii. Set better thresholds

I. Ecological Dynamics of *Aedes aegypti-Wolbachia pipientis w* AlbB Strain Interactions – Juan Sebastian Duran Ahumada
a. Described in 1924
    i. Incompatibility between 2 species of *Cx pipiens*
    ii. Hertig and Wolbach
b. 4 strains of wolbachia of interest for *Aedes* control
c. Types of control
    i. Incompatible Insect Technique
        1. Male releases
        2. Local suppression/elimination
        3. No impact on male fitness
    ii. Population replacement
        1. Self-sustained wolbachia frequency
        2. No impact on fitness
        3. Wolbachia mediated pathogen blocking
d. Study
    i. Stability of wolbachia
    ii. Mosquito fitness
        1. Fecundity
        2. Fertility
        3. Biomass of males and females
    iii. Performance
        1. Survival of males and females
        2. Development time
        3. Proportion of pupae to emerge as adults
        4. Adult sex ratios
e. Study done in field conditions – experimental houses
    i. blood fed 3 days/week for 30 minutes

        ii. Supplied with sugar water
    f. Tracked abundance – results were not sustained
    g. Conclusions
        i. Transient differences in abundances
        ii. Decreased frequencies
        iii. Equal or higher relative densities

Session 4

A. Update from Richmond County Mosquito Control – Mindy Kruty-Crothers
    a. IMM Program
        i. School education program
        ii. Larvicide
        iii. Adulticide
        iv. Surveillance
    b. Property, pool, and storm drain program (Allen Hillman)
        i. Larvicide storm drains
        ii. Work with homeowner to remediate swimming pools
        iii. Follow-up on complaints
            1. Inspection
            2. Tip and toss
            3. Larvicide
            4. Adulticide
    c. Use the 311-call system
    d. Pond program (Jerry Albee)
    e. Mosquito surveillance
        i. Trap every location twice a month
        ii. Big change after Hurricane Helene
    f. After the hurricane
        i. ULV spray in neighborhoods
        ii. PSA information being spread
B. The Public Health Entomology for All (PHEFA) Experience – Jamesia Henderson
    a. PHEFA - https://www.entsoc.org/advocacy-initiatives/public-health-entomology-for-all
        i. Internship and fellowship program
        ii. Partnership between CDC and ESA
            1. Fort Collins
            2. San Juan
            3. Atlanta
        iii. Created to help address the lack of diversity in entomology
        iv. 5 core areas
    b. CDC component
        i. Networking/Conferences
        ii. Lab experience
            1. Chemical assay
            2. Molecular techniques
            3. Insecticide-treated nets

4. Mosquito colony maintenance
   iii. Community involvement
c. Involvement with State Health Departments – new program
   i. Tick collection
   ii. Project leadership
   iii. Mosquito surveillance
   iv. Mosquito & tick surveillance
   v. Insecticide resistance testing
d. Professional development opportunities

C. Chatham County Season Overview – Ture Carlson
   a. April
      i. Yellow legged hornet traps
         1. Started in early March
         2. Year-long program
      ii. Worked with GDA
      iii. 11 of 67 trap locations have been positive
   b. Nuisance aerial adulticiding started in April
   c. May
      i. Honeybee complaints
         1. May 13
         2. May 29-30
         3. No hive loss
         4. Forager loss
      ii. 2 beekeepers "lost" foragers after canceled missions
   d. Tropical Storm Debby
      i. August 4th
         1. lots of rain
         2. Not much wind
      ii. CEMA needed sandbags
         1. Provide tons of sand
         2. Mosquito control made 328 sandbags for Chatham County facilities
         3. August 5th, left bags and shovels for homeowners to make their own sandbags
      iii. Closed Aug 6-7
         1. Facility inspection
         2. Handled EOC questions
         3. 9 dams have issues
         4. 1 large dam and 3 small dams failed
      iv. Aug 8
         1. Started inspection flights for EOC
         2. Too much water to larvicide
      v. Aug 9
         1. River flooding starts
         2. More inspection flights
         3. Surveillance
         4. I-95 bridge was 5 feet from being closed
         5. Crest occurred on Aug 12
      vi. Aug 16

1. Press conference with PH
2. Too much water to larvicide

vii. Aug 21

1. Aerial – 85,000 acres
2. Truck –

e. Hurricane Helene

i. Sept 23-26

1. Pre-storm assessment flight
2. Rainfall bands passed through county dropping 5+" of rain in places

ii. Sept 27

1. 76 mph winds
2. Lots of tornado warnings
3. Assessment flights
4. Surveillance

iii. Sept 28

1. Lots of power outages
2. Larval site inspections
3. Cleared access trails

iv. Sept 30 – Oct 4

1. Aerial adulticiding – 1260 acres
2. Ground larviciding – 55.1 acres
3. Brood hatch started Oct 4

v. Oct 5

1. Richmond County reached out for adulticiding help
2. Became complicated very quickly
3. Need a contingency plan with a contractor

f. Mosquitoes

i. *Culex* spp numbers barely changed after the hurricanes
ii. Possible Zika case – turned out to be lab error
iii. WNV

1. Human cases
    a. Homeless man
        i. Donated blood on July 4th
        ii. Classified as WNV+ presumptive
    b. Aug 9 – first actual case
    c. Sept 2 – second blood donor positive
2. Mosquito positives
    a. Spike in 2011
    b. 2024 – similar spike
    c. Control is done differently now
    d. Bottom line – keep them young
3. Heavy rains led to high nuisance complaints

D. Yellow-Legged Hornet Update – Randi Balog

a. https://agr.georgia.gov/yellow-legged-hornet
b. First reported in July 2023
c. From northern Asia
d. Yellow legged hornets

i. Bee eaters

1. Super aggressive to bees
2. Not terribly aggressive to people

ii. Nests die off in late fall
1. Put out 15-50 fertile queens
2. Start a new nest in the Spring
3. Everything else dies off

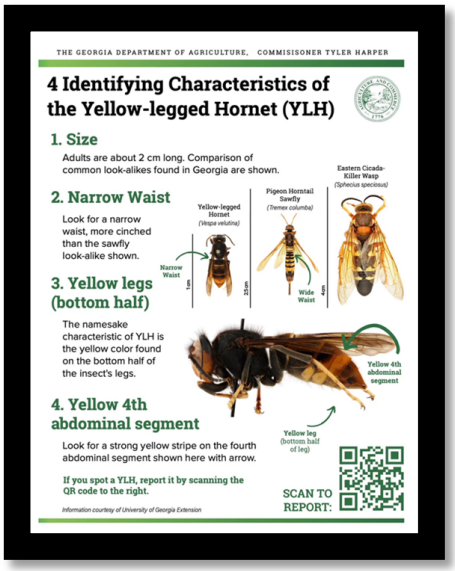
iii. The legs are partially or primarily yellow, hence the common name "yellow-legged hornet."

iv. The body and head coloration can vary.

v. This hornet is a social wasp species that constructs egg-shaped paper nests above the ground, often in trees.

vi. These nests can become large, housing an average of 6,000 workers.

vii. Several native or other introduced hornets are similar in appearance



e. Tracking the hornets
i. Tracker technology didn't work well, too heavy
ii. Traps with "Georgia juice"
iii. Lots of looking up for nets after letting worker go and watching where she flew

f. Savannah has been a hot spot

g. Difficult to observe outside of nest as nests are located high up in trees

h. Nest removal
i. PPE – chemical use
1. Spray nest to kill off workers and queen
2. Workers left will die off

ii. Bee suit

iii. Lift and climbing gear

i. UGA is working on projections for spread

E. Methods of Mosquito Biocontrol and Incidence of WNV in the Neotropics – Adrian Vasquez

a. IPM
i. Helps with habitat conservation
ii. Important in preventing pesticide resistance

b. Biocontrol – ecological interactions
i. Plant
ii. Fungi
iii. Bacteria
iv. Diverse parasites, such as nematodes
v. Predators
1. Mosquito fish have been a success, with some caveats
2. Copepods
3. Water mites
a. Parasitize mosquitoes
i. Water mite larva attaches to emerging mosquito
ii. Impacts mosquito fitness

        b. Feed on many other organisms in the freshwater habitat - https://pmc.ncbi.nlm.nih.gov/articles/PMC8321515/#:~:text=Water%20mites%20are%20small%20carnivorous,from%20its%20aquatic%20pupal%20stage.
    4. Future research question - Why is there little WNV in Latin America?
        a. https://pmc.ncbi.nlm.nih.gov/articles/PMC3958988/
        b. https://www.researchgate.net/publication/7228383_West_Nile_virus_activity_in_Latin_America_and_Caribbean?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6Il9kaXJlY3QiLCJwYWdlIjoiX2RpcmVjdCJ9fQ
F. Summer Training Session Discussion – Griffin, June 2025
    a. Agenda
        i. Basic mosquito biology
        ii. Mosquito-borne diseases in Georgia
        iii. Mosquito surveillance techniques
        iv. Basic IMM practices
        v. Control options and applications
        vi. Insecticide resistance
        vii. Pesticide labels and safety
        viii. Imported species
        ix. Barrier treatments
        x. Calibration
    b. Need to look at dates, times, and places

Business Meeting

1. Minutes approved
2. Treasurer's Report approved
3. Officers
    a. President – Caroline
    b. VP – Natasha
    c. Directors
        i. 1 year – Dan
        ii. 2-year – Bryan
        iii. 3-year – Mindy
    d. Sec/Tres - Misty
    e. Industry – Mike Riles
    f. Past President – Doug/Tiffany