GMCA 2026

Day 1 – 21 Oct 26

A. Session 1
    1. Opening remarks
        a. Natasha Agramonte
            i. AMCA Washington Day Conference
            ii. May 11-14
                1. Full day of prep
                2. One day on the Hill
            iii. Advocacy vs Lobbying
                1. Both promote a cause
                2. Advocacy includes public education
                3. Outcome is to raise awareness
                4. Legislative priorities
                    a. SMASH Act
                    b. ELC
                    c. Farm Act
                    d. Reducing Regulatory Burden
                5. Intelligent scheduling is important (thanks Elmer)
                6. Kay Hagan Tick Act
                    a. Signed into law
                    b. Not funded
        b. Elmer Gray
            i. Spring Workshop
            ii. Mosquito ID
            iii. Great sponsorship
    2. Samuel Harrod – Mosquito Control Update from Glynn County
        a. Geography
            i. Large salt marsh area
            ii. Major drainage basin
            iii. Large tidal ranges
            iv. Elevation average is 13 feet
            v. Humid sub-tropical climate
        b. History
            i. Public Works
                1. Early 1980s – physical ditching of marsh
                2. Mid-1980s -2000s: shift to larvicide and adulticide

ii. Currently contracted out to VDCI
    1. IMM program
    2. Traps
        a. Year-round New Jersey light traps
        b. Ovitraps
        c. Gravity traps
        d. Dyna traps
        e. CDC light traps
iii. Larvicide on ground and by plane
iv. Adulticide by truck and plane

c. WNV
    i. Alert local area
        1. Wear repellent
        2. Dump out standing water
    ii. Larvicide
    iii. Increase trapping until traps come back negative

d. Challenges
    i. Lots of salt marsh
    ii. Predators, esp alligators
    iii. Venomous snakes
    iv. Salt march mosquitoes
    v. Tourism (Andrew's Island)
    vi. Public perception

e. Communication
    i. Public outreach at events
    ii. Always ready to talk to the public
    iii. Deal with misinformation

3. Rick Bell – Spill Management: Are You Ready?
    a. Need to be prepared
        i. Protocol needs to be prepared ahead of time
        ii. Products are usually more dangerous when spilled than sprayed
    b. Spills can occur at any time and at any place in the movement of the pesticide
    c. Degree of readiness has a direct impact on the severity of the situation
    d. Building a protocol
        i. Clearly defined guidelines for proper response and actions
        ii. Protocols only work when written down, accessible, and known before it is needed
        iii. Practice, Practice, Practice

iv. Check your spill kit frequently
    1. Everything is in the kit
    2. There is enough for any size spill
v. Know your protocol
vi. First actions
    1. Isolate the area using physical means
    2. PPE
    3. Start spill control
vii. Office staff
    1. Collect info
    2. Keep calm
    3. Provide accurate information
viii. Assessing the scene – document everything
    1. Take photos
    2. Write down location and time
    3. Product name and estimated amount of material spilled
    4. Where could the product go?
    5. Clean up spill ASAP
ix. You are the expert, so understand the issue
x. Determine any need for assistance
xi. Notify your manager and your office
xii. Spill kits should include:
    1. Rubber gloves
    2. Dustpan and whisk broom
    3. Buckets
    4. Garbage bags
    5. Paper towels
    6. Scrub brush
    7. Soak up absorbent
    8. Absorbent snakes
    9. Soap
    10. PPE
    11. Buffers and acidifiers
xiii. Do not hose off area with water
xiv. The key to spills is avoiding them if possible and dealing with them effectively otherwise

4. Tiffany Nguyen – *Anopheles* Surveillance in Georgia
    a. Locally acquired malaria, 2023

i. Florida – 7 cases
ii. Texas – 1 case
iii. Maryland – 1 case
iv. Arkansas -1 case

b. 2025
i. Funding issues
ii. Global malaria surveillance lost funding
iii. Federal researchers were recalled to do work in US
iv. Shared *Anopheles* data with CDC malaria Branch
v. DPH was funded by CDC to do *Anopheles* surveillance
1. DPH entomologists
2. Collaborators
a. Chatham County
b. Richmond County
c. 3 Additional Districts may be involved in 2027

5. Mike Riles – *Aedes aegypti* Reemergence in the Florida Panhandle
a. Problem
i. Disease implications
ii. Lots of tourism and lots of potential for travel-related cases
b. Objectives
i. Characterize distribution and temporal re-establishment of aegypti and interaction with albopictus
ii. Compare surveillance and control strategies
iii. Evaluate interactions
c. *Aedes aegypti* is an established invasive species
d. It has been reported as far north as Canada
e. Florida
i. Bay County, Florida
1. Last collected in1992-1993 when albopictus was introduced
2. Detections in 2017, 2019, 2022, and 2023
3. 2022-2026: adults found in Panama City, FL
4. Spread has continued
ii. Hillsboro 2026
1. 17 travel-related cases
2. Over 300 locally acquired cases
iii. Expected outcomes
1. Document the distribution of aegypti

2. Create a comprehensive synthesis of re-establishment, surveillance, and control

6. Katie Williams – The Intersection of Species, Habitat, and Active Ingredient
    a. Biology affects where eggs are laid
    b. Control is stage-specific
    c. Habitat and climate affect distribution
        i. Running water
        ii. Transient/floodwater
            1. Most important pest species
            2. Some vector species
            3. Large numbers emerge at the same time
        iii. Permanent water
            1. Important vector species
            2. Type of water varies
        iv. Containers
    d. Larvicides - active ingredients
        i. Bacterial – ingested, apply during late 1st through 3rd instar
            1. Bti – no known resistance
            2. Bs – has a residual up to 4 weeks
        ii. Juvenile hormone mimic – absorbed, apply to 2nd to 4th instar
            1. Can be applied pre-flood
            2. Does not kill immediately but prevents emergence as adult
        iii. Spinosad – both, apply to 2nd to 4 instar
            1. Residual
7. INDUSTRY SPOTLIGHT
    a. Valent Health – Katie Williams
    b. Clarke – Cale Payne
    c. Veseris – Scott Artman
8. Jennifer Baltzegar – Emergence of a Knockdown Resistance Mutation, F1534S, in Two Suburban *Aedes albopictus* Populations
    a. Pyrethroids are commonly used adulticides
        i. Target voltage-gated sodium channels
            1. Pore embedded in cellular membrane
            2. Deals with nerve function
        ii. Binds to pore and keeps it open
    b. Mutations occur to genes within the pore changing its shape
        i. Protein changes
        ii. Function changes

c. Raleigh, NC
    i. Background
        1. All private mosquito control
        2. Developed a genotyping assay
        3. Tracks individual genotypes
    ii. Sampling (Baltzegar et al. 2026. Parasites Vectors)
        1. Focused area
            a. No kdr in 2016
            b. Emerged in 2018
            c. All sites by 2022
        2. Expanded the area of study
    iii. Kdr resistance can be explained by property value
    iv. Selection coefficients are related to relative fitness between alleles
d. Richmond County, GA
    i. Mix of private and county control
    ii. Kdr resistance is low but building
        1. Higher in areas with higher population
        2. Is selection currently happening or is this normal for the population
        3. Most resistance is heterogeneous
e. F1534S is a sentinel mutation

9. Daymond Hughes – Staying Safe by by Being Aware of Natural Hazards
    a. Complacency can be a problem
    b. Problem species
        i. Coyotes
            1. Native to North America
            2. Not indigenous to the eastern US
            3. Very adaptable
            4. Not a big issue for humans
        ii. Black bears
            1. 3 distinct populations in Georgia
            2. Range is expanding/population is increasing
            3. Native species
            4. Problems occur when bears become acclimated to people
        iii. Beaver
            1. Disease potential
                a. Giardia (beaver fever)
                b. Tularemia - beaver tick (*Ixodes banksi*)

        c. Rabies can occur
    2. Rare human attacks
    3. Strictly vegetarian
    4. Can weigh up to 70 lbs
iv. Venomous snakes
    1. Copperheads
        a. Found in most of Georgia except far south
        b. Very cryptic
    2. Pygmy rattlesnake
        a. Varied color phases
        b. Found in most of Georgia except far north
    3. Eastern diamondback
        a. Southern half of Georgia
        b. Largest venomous snake in North America
    4. Timber (canebrake) rattlesnake
        a. All of Georgia
        b. Cryptic
    5. Cottonmouth (water moccasin)
        a. Zorro mask
        b. Most of Georgia except northeast
    6. Eastern coral snake
        a. South part of Georgia
        b. Confused with scarlet king snakes
        c. Not a pit viper
        d. Red on yellow, kill a fellow. Red on black, friend to Jack. Not always true.
v. Hymenoptera
    1. Problem species
        a. Wasps, hornets, bees
        b. Fire ants
        c. Velvet ants
    2. Mostly will leave you alone unless you bother them
    3. Potential for Africanized bees in Georgia
vi. Spiders
    1. Problem species
        a. Black widows
        b. Brown recluse
            i. Confused with southern house spider

ii. Only found in a small area of Georgia

2. Many other species that do not have dangerous venom

vii. Ticks

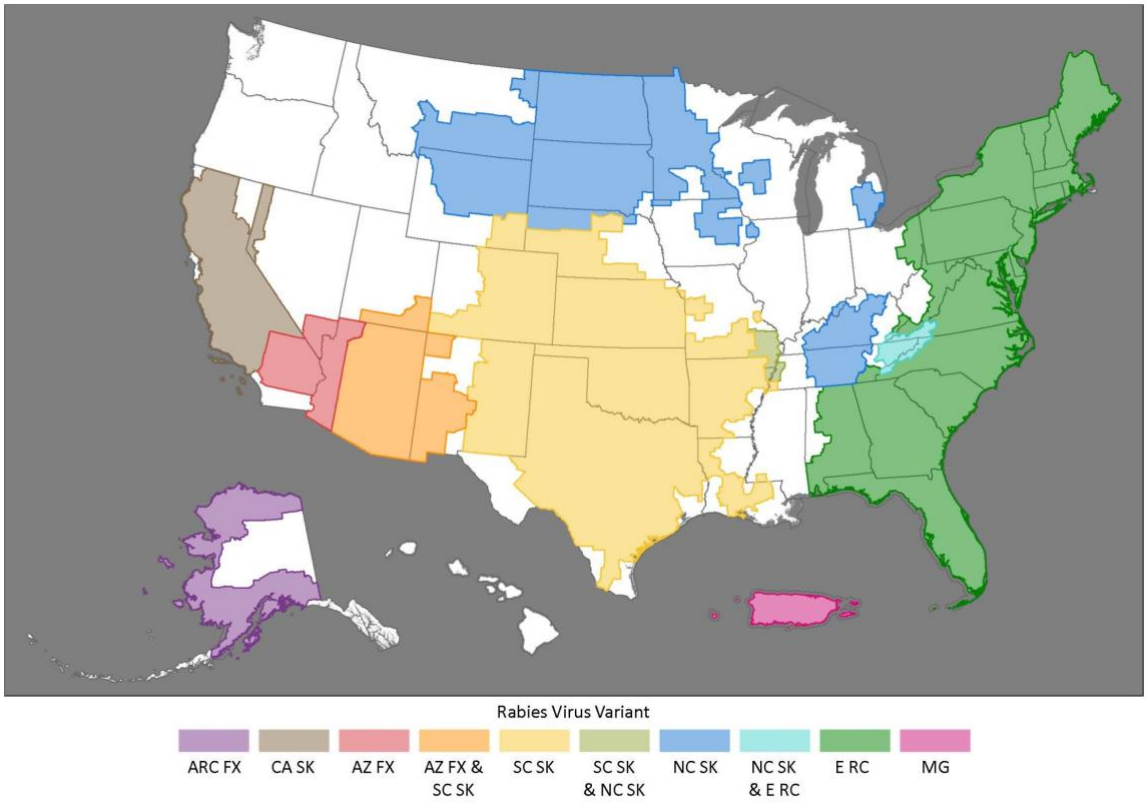
1. Disease transmission
2. Alpha-GAL

viii. Mosquitoes

1. Disease transmission
2. Nuisance

c. Rabies

i. Variants have defined areas in the US



1. Coyote
2. Fox
3. Skunk
4. Bat
5. Raccoon

ii. Raccoon rabies is a problem in Georgia

iii. Oral rabies vaccine drop program to stop the spread of raccoon rabies and eventually eliminate it

Day 2 – 22 Oct 26

B. Session 2
    10. Rosmarie Kelly – Vector Surveillance in Georgia
    11. Caroline Efstathion – In2Care Trap Usage in a Zoo Environment
        a. Unique situation with lots of challenges
        b. Focus
            i. avian malaria and penguins
            ii. WNV
        c. In2Care traps
            i. Developed for *Aedes albopictus* and *Ae aegypti*
            ii. Will attract *Culex* spp
            iii. Can't be put in animal exhibits
            iv. Treatment and control sides on opposite sides of zoo
        d. Monitoring and data collection
            i. April through October
            ii. Checked traps every 4-5 weeks
                1. Counted larvae
                2. Reset traps
                3. Made note of any adults in area
        e. Stats
            i. First sampling date – no difference
            ii. Treatment site dropped towards middle
            iii. No significance later on during high rainfall periods
            iv. *Culex* larvae disappeared
            v. Need adult trapping data to confirm but this wasn't possible
        f. Treatment appeared to be successful
        g. Will continue next year
        h. Will work on modeling the system
        i. Want to develop a protocol for zoos
    12. Atom Rosales – Evolution of UAS to Enhance IPMin Collier County, FL
        a. Species of concern
        b. Primary challenges
            i. Increasing urbanization
            ii. Lots of salt and freshwater habitat
            iii. Proximity to public lands
        c. Historical control – thermal fogging by plane and helicopter
        d. Currently have an IMM program with lots of tech

e. District
    i. 14 operational zone
    ii. Complaint form on website
        1. Create heat maps
        2. Look at both typical and unusual clusters
        3. Sample is biased by socioeconomic status
f. Operations
    i. Were very adulticide oriented
    ii. Started shifting to more larviciding in 2018
g. Technical development
    i. Drones
        1. Operated under a special license under the FFA
        2. Started in 2018
    ii. Revamped program in 2023
    iii. Used for larviciding and inspections
    iv. Limitations
        1. Small drones
        2. Limited carry capacity
        3. Small number of trained personnel
    v. Added new drones that can carry a bigger payload
    vi. Suitable areas
        1. Size of control area
        2. Expediency needed
        3. Dangerous sites
    vii. Use a variety of products depending on species and site
    viii. Testing the drone applications
        1. Single pass is not effective
        2. Built program to recommend spray swath based on spray data
        3. Degree of overlap is required based on environmental conditions and habitat
h. Strategy
    i. Components
        1. Risk to population
        2. Habitat
        3. Meteorological data
        4. Surveillance data
        5. Sensitive areas

ii. Working on a program to analyze data to determine the treatment sites

13. Ture Carlson – Chatham County Seasonal Update
    a. Chatham has been hot and dry for 12 months
    b. Very early WNV+ mosquitoes
    c. Treated storm drains by week 21
        i. Weird explosions of quincs
        ii. Over an average season
    d. Bunyavirus positive mosquitoes
        i. First time collected since 2013
        ii. Most likely keystone virus
    e. Salt marsh mosquitoes
        i. Lots of complaints in week 23
        ii. *Ochlerotatus sollicitans* peaked in weeks 24-25 (usually *Oc taeniorhynchus* is predominate)
            1. Most collected at the SC site
            2. Over 26,000 *Oc sollicitans* caught
        iii. Trigger may have been the little bit of rain that fell
        iv. Complaints dropped in week 25
    f. Sending mosquitoes to Mercer, CDC, USC, SCWDS, FMEL
    g. Also involved in some tick, culicoides, and yellow legged hornet work
    h. Digitizing historical data
        i. Interesting trends
        ii. Changes to populations over time
14. Monica Anne Perry – Arbovirus Surveillance in Mosquitoes and Small Mammals at the Savannah River Site
    a. Master's project on mammals
    b. Cotton rats (*Sigmodon hispidus*)
        i. Potential host for EEE
            1. Circulates in freshwater swamps
            2. Enzootic vector is *Culiseta melanura*
            3. Usual host are birds
        ii. High viremia found in cotton rats in lab
        iii. Studies indicate that cotton rats have been found to have EEE antibody, but viremia has not been reported
    c. 2025
        i. Catching cotton rats
            1. Trapping in grassy fields near wetlands

2. Drew blood in the field
3. Extract serum from blood

ii. Collected mosquitoes in the area with CDC light trap over 3 trap nights
1. 1190 individuals
2. 9 species

iii. Negative results - why
1. No virus circulating?
2. Cotton rats aren't getting infected?
3. Viremia isn't high enough?

d. 2026
i. More mosquito trapping
ii. Data haven't yet been analyzed
iii. Would like to do antibody testing as well

New UGA Program - Certificate Program in Medical Entomology and Vector-Borne Disease Surveillance

15. INDUSTRY SPOTLIGHT
a. Derek Wright – AMVAC/AMGUARD
b. Mike Riles – Central Life Sciences

16. Taylor Pearson – What's Ticking? SCWDS Tick Research Updates for Georgia
a. SCWDS founded in 1957
i. Wildlife health
ii. 17 member states
iii. One Health research

b. Asian Longhorn Ticks
i. Introduced in late 2000s
ii. Detected in 17 states to date
iii. Parthenogenic
iv. Carry a number of disease organisms in Asia
v. Is a competent host in the lab for US pathogens
vi. Huge host range, including humans

c. Coastal tick work
i. Partner
1. DNR
2. USDA APHIS
3. Wildlife pest control

ii. CAPC collaboration
1. Data from IDEX

2. Lyme disease positives found along Georgia coast

iii. Counties
1. 22 counties surveyed
2. 13316 ticks collected

iv. Research objectives
1. Prevalence, distribution, and risk
2. Effect birds have on tick movement
3. Black bear

v. Field collection
1. Dragging
2. Ticks from hosts
a. Blood samples
b. Tissue samples

vi. Ticks
1. Highest numbers are lone star ticks
2. Also see gulf coast ticks
3. Several other species

vii. Pathogens
1. Spotted fever group rickettsia in high numbers
2. *Borrelia* spp
3. *Ehrlichia* spp
4. *Borrelia lonestari* detected in host species

d. Practical implications
i. Tick talks
ii. Taking on ticks
iii. Providing info to veterinarians and public health

C. Session 3

17. Lance Durden – Fleas and Lice: Medical and Veterinary Importance and Recent Research

a. Chewing lice
b. Sucking lice
i. Have modified tibia-tarsal claws adapted to holding on to the hosts hair
ii. Hemimetabolous
iii. Contain symbiotic bacteria to synthesize vitamin B
iv. Life cycle
1. Nits (eggs)
a. Attach to hairs by egg cement

b. Entraps host DNA, which is being used to study human evolution
c. Nymphs hatch out and climb down to start blood feeding
d. Adults remain on host

2. Human lice
    a. Head lice
        i. Pesticide resistance
            1. resistance gene
            2. were resistance to what can be bought over the counter
        ii. Pathogen
            1. Found *Bartonella quintana*
            2. Supposed to be only transmitted by body lice
    b. Body lice
        i. Lay eggs on clothing
        ii. Feed on body
        iii. Carry epidemic typhus (*Rickettsia prowazekii*)
            1. Transmitted in feces
            2. Defecate while feeding
            3. Can recrudesce
            4. Last recorded human outbreak was in Philadelphia in 1877
        iv. Can carry trench fever (*Bartonella quintana*)
            1. Transmitted through feces
            2. Some people can have inapparent infections
            3. Rare from 1945-1990
            4. Reemerged in homeless populations
        v. Can carry epidemic relapsing fever
            1. *Borrelia recurrentis*
            2. Not in North America
            3. Related to Lyme disease
    c. Crab lice
        i. Opportunistic
        ii. Will attach to other coarse hairs besides public hairs

3. Lice on other animals
    a. Smallest species found on flying squirrels
    b. Largest species found on the peccary
    c. Lice on harp seal carries heartworm
    d. Flying squirrel lice carry epidemic typhus, which can infect people but doesn't affect the squirrel
    e. Other squirrel lice also carry the bacteria

c. Fleas
    i. Holometabolous
        1. Egg
        2. Larva
        3. Pup
        4. Adult
    ii. Almost all immature stages live off hosts
    iii. Murine typhus
        1. *Rickettsia typhi*
        2. Carried by oriental rat fleas and cat fleas
        3. Reservoir hosts
            a. Peridomestic rats
            b. Virginia possums
            c. Cats??
        4. Brought into Savannah ports
            a. Probably in the 1920s
            b. 1000s of cases per year in the1930s and 1940s
            c. Controlled with DDT and warfarin to kill rats
        5. Reemerging in the US
    iv. Plague
        1. *Yersinia pestis*
        2. Transmitted by fleas
        3. May be transmitted by body lice as well
    v. Cat fleas transmit cat scratch fever
    vi. Chigoe flea
        1. Male – smallest flea with longest genitalia
        2. Female – largest flea (neosomic)

d. 4th edition of Medical and Veterinary Entomology due 2028

18. Nalany Richardson – Evaluating Bird-Derived Volatile Organic Compound Blends for Mosquito Trap Efficiency in the Savannah River Site
    a. EEE transmission cycle

i. Circulates in birds
ii. Carried by *Culiseta melanura*
    1. Feed on birds
    2. Found throughout the eastern US
    3. Can be easily caught in bird-baited traps
iii. Transmitted to horses and humans by a variety of species

b. Mosquito attraction
    i. Multi-modal
    ii. Whole bird is more attractive than individual parts
    iii. Experimental design
        1. Both traps baited with CO2
        2. One trap baited with odor, the other with the solvent only
        3. Attached odor near trap opening
    iv. Results
        1. Caught lots of *Anopheles crucians* complex
        2. Mosquitoes preferred the chicken odor
        3. Low numbers of *Cs melanura*
    v. Second study – will passerine bird odors attract *Cs melanura* better
        1. Collect volatiles from birds using airflow
            a. Dissolve in pentane solvent
            b. Found 15 conserved volatiles
        2. Test volatiles on mosquitoes in olfactometer
        3. Field work

19. Subhika Rao – Emerging Insights on *Anopheles* Mosquitoes and Malaria Risk in the United States
    a. Malaria was eliminated from US in 1951
        i. In 2023 locally acquired malaria occurred in several states
        ii. More cases occurred in 2025
    b. *Anopheles* spp are found in nearly every county in Georgia
    c. *Projects*
        i. Bycatch data
            1. Mosquito data collected during WNV surveillance
            2. 5 *Anopheles* spp detected
            3. Yearly trapping effort depends on funding and disease events
            4. Species
                a. Anopheles crucians
                b. An punctipennis
                c. An quadrimaculatus

d. *An perplexans*
e. *An barberi*

5. Molecular species confirmation
    a. Chatham County data
    b. Members of complex were found throughout the county
    c. Some hybrid species were also found
6. Georgia Mosquito Control programs
    a. Based on a 2017 survey (https://www.gamosquito.org/resources/GA_Mosquito_Control_Programs2017_update.pdf)
        i. Looked at financial information
        ii. Looked a surveillance
        iii. Looked at case data
    b. Many counties have no mosquito control at all and most of those that do don't do surveillance
    c. Many gaps in coverage
7. Additional projects
    a. Laboratory support for domestic malaria cases
    b. Biology, ecology, and host presences of *An crucians sl* and *An punctipennis*

d. Work supported by a PHEFA fellowship

20. Nick Sumner – Proposed Pesticide Rule and Regulation Changes
    a. Why are rules being updated?
        i. Federal alignment
            1. Update
            2. Clarify
            3. Align competency requirements
        ii. Modernization
            1. Testing categories will be more difficult
                a. ID verification required
                b. All exams will be monitored
            2. Aerial application methods are being updated
        iii. Accountability and documentation
    b. Commercial applicators
        i. License renewal
            1. 5-year cycle
            2. CEUs remain category-specific

            3. Training must be verified
        ii. Uncertified applicator training required yearly
            1. Supervision based on label requirements
            2. Training records must be certified
        iii. Labels will have different compliance documentation required
        iv. Additional record-keeping will be needed
        v. Landscape posting, post-application info, and vehicle marking required
    c. Private applicators
        i. Changes to aerial applications
        ii. Probably other changes
21. Mary Beard – Arbovirus Dispersal Risks Between Mosquitoes, Invasive Wild Pigs, and Domestic Pigs
    a. Wild pigs
        i. Invasive and destructive
        ii. Create wallows with organically polluted water – mosquito breeding sites
        iii. Serve as both blood meals and reservoirs for some pathogens
    b. Mosquitoes of interest
        i. *Culex* spp
            1. Avian malaria
            2. WNV
            3. JE
        ii. *Anopheles* spp
    c. Concerns
        i. Pathogen spillover to domestic animals
        ii. Can lead to economic damage
    d. Objective
        i. What mosquitoes are interacting with both wild and domestic pigs
        ii. Looking at pathogen antibodies
        iii. Testing mosquito blood for blood meal type
    e. Methods
        i. Sites in NC, SC, and GA
            1. Pig barns with similar build and habitats
            2. Wild pig wallows nearby
        ii. Used CDC light traps to catch mosquitoes
    f. Results
        i. Mosquitoes

1. Type of ventilation affects numbers of mosquitoes found indoors
2. *Culex* spp found in pig wallows and inside pig barns

ii. Pig blood analysis
1. Data still being analyzed
2. WNV antibody found

g. Concerns
i. Economic stability
ii. Human health risks
iii. Ecosystem health
1. Habitat destruction
2. Pathogen spread

h. New article – *Anopheles* spp Habitat Modeling, J Entomol. In press

22. Pete Obenauer – Using Field Cage Trials to Assess ULV Droplet Penetration for Controlling *Culicoides furens*
a. Technical manual forthcoming
b. Biting midges
i. 78 genera
ii. Over 4000 species world-wide
iii. Persistent, painful biters
iv. Females feed on blood
v. Midge larvae usually found in muck in aquatic and semi-aquatic habitats

c. *Culicoides*
i. 1000 species
ii. Feed on humans and animals
iii. Carry many pathogens, including bluetongue virus in sheep and cattle and African horse sickness
iv. Current concern is Oropouche virus

d. Control
i. May-Oct, 2025
ii. Brunswick, GA
iii. 6 trapping locations
1. CDC light traps
2. Dry ice
3. Modified catch net to keep the midges without getting a lot of bycatch

iv. Working with midges

1. Bioassay cages
2. 10% sucrose solution
3. Kept them cool and moist
4. Difficult to keep them alive
5. Caught over 3000 species
    a. Mostly furens
    b. Some sonorensis

v. ULV control
1. Droplet size is related to the size of the mosquito and the need to have the droplet sit in the air column
2. Midges are much smaller
3. ULV spray did have an impact on the midges, with 100% mortality after 60 minutes in cage tests
4. Concern is where are the midges during spray events
    a. Probably resting in canopy
    b. Canopy height will have an impact on control

23. Dena Oliva – Operational Excellence in Mosquito Control
    a. Operations
        i. Aviation
        ii. Ground
        iii. Surveillance
    b. Surveillance program
        i. 43 traps weekly
        ii. Salt marsh surveillance
        iii. Fish program
        iv. Investigate suspect cases
    c. Aviation program
        i. Helicopters
            1. Surveillance
            2. Larviciding
            3. ULV
        ii. 2 drones
        iii. Airboat
    d. Ground program
        i. 14 main zones
            1. Larvicide zones
            2. Spray zones
                a. Thermofoggers

b. ULV
    i. Hand
    ii. Truck
ii. 400,000 residents
iii. Service requests
iv. Source reductions
v. Wide variety of habitats

e. Updates
    i. Current
        1. New database
        2. Mesa tablets
        3. Vortex larvicide unit
        4. Updated ULV units
    ii. Future
        1. Weather Station units
        2. New helicopter
        3. New drones

Banquet Speaker

Sabaa Longman – Monitoring and Addressing Growing Pyrethroid Resistance at a Global and Domestic Scale

1. Affect of pro-insecticide
    a. Chlorfenapyr
        i. Pyrrole-based pro-insecticide
        ii. Targets pyrethroid-resistant mosquitoes
        iii. Affects the mitochondria
        iv. Slow killing
    b. Treatment
        i. Mosquitoes exposed for one hour
        ii. Look at expressed genes after 24 and 72 hours
        iii. Genes associated with pyrethroid resistance are up regulated after 24 hours
    c. Mosquitoes were allowed to blood feed and lay eggs
        i. Exposed mosquitoes had a lot of egg retention
        ii. Wasn't repeatable
        iii. No effect on wing length and dry weight
2. CDC Bottle Bioassays

a. Pesticides
    i. Permethrin and permethrin + PBO
    ii. Deltamethrin
b. Molecular analysis of mosquitoes that survived
c. Results are coming

Day 3 – 23 Oct 26

D. Session 4

24. Gonzalo Vasquez-Prokopec – Targeted Residual Spraying

a. Epidemics
    i. Zika
        1. Head of WHO said vector control doesn't work ☹
        2. The better statement is that we need to know more about what to use, when to use it, and where
        3. Created a big outbreak and has since mostly disappeared
    ii. Dengue
        1. Residual insecticides
        2. Targets the behavior of the mosquito
            a. Where are the mosquitoes resting
            b. When are they resting
        3. *Aedes aegypti* were found lower on the walls 17 times more often
    iii. Mosquito flight
        1. Fly then turn
        2. Questions
            a. How long to they fly
            b. At what angle do they turn
        3. *Ae aegypti* fly and rest lower
        4. However, they will fly to dark surfaces
        5. Place residual sprays low on the wall as opposed to spraying the whole wall
b. Changing public health practices
    i. Does it kill mosquitoes flying if you only spray low?
        1. No change to efficacy
        2. Saves time and money
            a. High community acceptance
            b. Took 10 minutes on average vs 40 minutes for full room with moving furniture

ii. Applying control at start of season vs applying after cases are detected
    1. Looked at seroconversion in children
        a. Related to time spent outside of house
        b. 60% decrease in seroconversion
    2. Mosquito parity and age
        a. Mosquito population stayed young as long as the residual spray was active
        b. Younger females were dying but older females were dying in higher numbers
        c. Reduces transmission rates
    3. Unsprayed houses
        a. Saw a reduction in mosquitoes in treatment area
        b. 60% coverage was enough to protect all houses
iii. Global policy supports TIRS – selective indoor residual spraying for dengue control and malaria

25. Dan Killingsworth – Practical Residential Mosquito Management: Optimizing for Mosquito Control and Minimizing Non-Target Impacts
    a. WNV reshaped mosquito management in the US
    b. Mosquitoes in suburban settings
        i. Tree holes and artificial containers
        ii. Ditches, catch basins, and other water containment structures
    c. Public health vs private pest control
    d. Study: Evaluating 2 backpack sprayers for barrier spray
        i. Typical Backpack fogger
            1. Physically demanding
            2. Loud, leaky, cumbersome
            3. Limited ability to cover large areas
            4. Hard to reach tight areas
            5. Possibility of chemical trespass
        ii. NPD Boss Eliminator E320 18-volt sprayer
            1. Lightweight
            2. Easier to handle
        iii. 15 sites
            1. 5 with fogger
            2. 5 with sprayer
            3. 5 controls
        iv. Collected bycatch

v. Mosquitoes collected
    1. Control – 4186
    2. Fogger – 3953
    3. Sprayer – 3284
vi. Outcome
    1. Neither fogger or sprayer reduced mosquito numbers significantly
    2. Mosquitoes varied spatially among properties
    3. No significant clustering was seen
        a. *Culex nigripalpus* was found at all sites but in highest numbers near the woods
        b. *Aedes albopictus* were concentrated in 3 sites near a home with lots of breeding sites
        c. *Culex quinquefasciatus* had widespread even distribution likely related to neighborhood infrastructure
        d. *Aedes vexans* were most abundant at neighborhood periphery near water sources
    4. Non-target impact
        a. 8915 collected
        b. No significant impact between treatment and control groups
        c. Used CDC light traps, BGS-2 traps, and blue vane traps (https://www.bluevanetraps.com/about-us)
    5. Bifenthrin amounts sprayed were the same between sprayer types
vii. Conclusions
    1. Need to do more than just spray
        a. Surveillance
        b. Perimeter concerns
        c. Source reduction
        d. Products used
    2. Additional work is needed to determine why
        a. Species resting sites
        b. Amount of pesticide deposition

26. Tyler Follman – Chatham County Larvicide Resistance Testing
    a. Prologue
        i. CCMC documented methoprene use since at least 1985

ii. Started seeing emergence after treatment
iii. Question: treatment failure or mosquitoes just flying in
iv. Emergence traps showed treatment failure

b. Methoprene resistance is known
c. Needed a larval resistance testing protocol - Dr Buckner – FMEL
d. Practicing the protocol
    i. Expected results with no resistance
        1. Control <20% inhibited emergence
        2. Higher doses should have >90% inhibited emergence
    ii. Unfortunately, most of the mosquitoes died just from being in the cups
        1. Adjusted rearing conditions
        2. Did a food assay to determine correct amount of food to rear larvae
e. Got an intern whose job was to run the larval assays
    i. High survivability in control
    ii. Also saw a high survivability in treatment
    iii. Made it difficult to calculate an accurate LC50 value
f. Needed to compare field results to a susceptible strain of mosquito larvae (Sebring)
    i. First trial
        1. Over 50% of the larvae died in the control group
        2. Got almost no adult emergence
    ii. Changes
        1. Got tips from CDC on rearing these larvae
        2. Changed rearing protocols for both sets of mosquitoes
    iii. Did get better adult emergence, so the protocol changes did work
g. Future work
    i. Will be doing more assays
    ii. Assays with additional active ingredients
    iii. Will be checking other species from other locations
    iv. Have historic data on treatment products and amounts for different areas
h. Have switched active ingredients in the spoil site and got better results

27. Jared Degelmann – AIMCD's Lab Renovation Project
    a. What was wrong with the old lab
        i. Outdated
        ii. Not enough room

iii. Random and insufficient storage
iv. Workflow was undefined
v. Lab was used as an office
vi. Cleaning was difficult
vii. Heavy lab traffic by non-lab personnel
viii. Needed protocols

b. Needs
i. Limit access
ii. Chemical proof tabletops and floors
iii. New color scheme
iv. New equipment
v. New storage
vi. Better workflow

c. The job was hard, messy, noisy, and a bit dangerous
d. Did a lot of the work in-house
e. Trying to keep lab one way in one way out
i. Closed off one door
ii. Added a self closing metal door to room

f. Added equipment
i. Class II A2 biosafety cabinet
ii. -25 degree freezer
iii. Micro plate washer
iv. Centrifuge
v. Prep stations
vi. ID stations
vii. Fire box
viii. Plate reader for ELISAs

g. Total cost $30388

28. Skyler Kerr – Update from the Black Fly Research and Resource Center
a. Colony history
i. Cornell 1981 (Gates Foundation funding)
ii. University of Arizona 1988
iii. Clemson 1991
iv. UGA 1999

b. Projects
i. Larviciding
ii. Repellents
iii. Trap design

iv. Outreach

c. Colony basics
    i. 9 modified lobster tanks with runways
    ii. Running water
    iii. Hold 300,000 larvae
    iv. Feed high protein slurry every 10 minutes every day (automatic feeder)
    v. 3 full-time and 4 part-time employees
d. Cycle
    i. Autogenous species in colony
    ii. Hatch eggs on day zero
    iii. 7 larval instars
    iv. Once they begin pupating, a black hood is put over the tank
    v. Funnel at top of hood
    vi. Tube at top of funnel collects adults
    vii. Kept in tube for 45 minutes for mating
    viii. Placed into container to release into ovipositing chamber
e. Typically collect 1.5 to 2 million adults per year
f. Projects
    i. Internal
        1. Bellec trap design (Gates Foundation)
            a. Designed in 1970s
            b. Collects flies laying eggs
        2. Collaborative effort to improve trap design used in Africa
            a. Pilot study
                i. Miniature tank painted a uniform color
                ii. Aluminum sheet painted different colors and coat with tanglefoot
                iii. Cover with clear hood
            b. Next step is to look at removing flies from sheet for successful testing for Onchocerca
    ii. External
        1. Biological supplier for BEI Resources
            a. Free
            b. Ship all stages
        2. Projects
            a. Salivary proteins for potential immune system therapies

b. Genomic sequencing
c. Mitochondrial sequencing

29. Skyler Nichols – Mosquitoes and Pollination
    a. Mosquitoes visit flowers for nectar
        i. Act as pollinators
        ii. Respond to distinct floral cues
        iii. Size differences may influence pollen load and placement
    b. Research questions
        i. Sex differences
        ii. Species differences
        iii. Response to floral odors
    c. Pollination assays
        i. Goldenrod
        ii. *Aedes albopictus*
        iii. Methods
            1. 20 mosquitoes per night
            2. 3 nights per plant
            3. Treatments
                a. Mixed sex
                b. Single sex
            4. Control with no mosquitoes
        iv. Data collected
            1. Did mosquitoes pickup pollen
            2. Did mosquitoes feed from flower
            3. Did the plant produce seeds
    d. Results
        i. 59% of recovered mosquitoes had at least one pollen grain
        ii. Most found on thorax
        iii. Females more likely to have pollen on them
        iv. Cold anthrone test to determine sugar feeding
            1. 63.9% were feeding
            2. Some feed but had no pollen so may have already transferred the pollen
        v. Seed viability increased compared to controls, with mixed sex exposure showing highest seed production (preliminary data)
    e. Future
        i. Continue working with other species
        ii. Define floral chemicals

iii. Continue with ongoing work

Business Meeting

Accepted meeting minutes

VP: Ture Carlson

President: Dan Peach

3rd year director: Skyler Kerr

Secretary-Treasure: Vanessa Glasscock

Industry Rep: Scott Artman

Next annual meeting: Griffin UGA Campus, Oct 20-22