Georgia Mosquito Control Association
15-17 Oct 208

15 Oct:
First Session

1) *Culex coronator* in Coastal GA and South Carolina – Bobby Moulis
    a) Adults being found in many different habitats
        i) Usually in CDC light traps
        ii) Twice in gravid traps
    b) Larvae rarely found
        i) Occasionally found in brackish water habitat
        ii) Found in a variety of habitats
    c) Evidence in literature of human biting
    d) Not a lot known
2) A Day in the Life of a Director – Henry Lewandowski
    a) Important Functions
        i) External Liaison
            (1) Board of Commissioners
            (2) Emergency Issues
            (3) Citizen concerns
            (4) Health Dept
        ii) Develop Staff
            (1) Listen
            (2) Discuss plans, results, problems
            (3) Small errors are great learning tools
            (4) Learn to let go
            (5) Bring solutions, not problems
            (6) Work to eliminate fear
            (7) Staff should ask questions
        iii) Develop and control budget
        iv) Set performance standards
            (1) Hire
            (2) Fix or fire
            (3) Become indispensible both within and without your organization
            (4) Need protocols and policies, but not too many
            (5) Be careful what you allow
            (6) Spray protocols – need vs demand
                (a) Adjusted according to need
                (b) Varies for nuisance vs vector species
            (7) Don't get complacent
                (a) Correspondence, content, appearance
                (b) Presentations
                (c) Don't give residents the run around
        v) Lead by example
        vi) Develop mission/operational goals

(1) Short-term
(2) Long-term

vii) You are part of the community
(1) Attend public functions/events
(2) Student internships
(3) SCAD Film Documentary

3) INDUSTRY SPOTLIGHT
   a) Peter Connelly – AMVAC Environmental Products
      i) Dibrom (Naled)/Trumpet
         (1) Labeled for application over water
         (2) Wide area application
         (3) Use in closed system
         (4) Fixed wing and rotary aircraft application
      ii) AMVAC Product labels – http://amvac-chemical.com/labels.htm
      iii) Nuvan Prostrips
         (1) Control in storm drains?
         (2) Enclosed area control
         (3) Available from ADAPCO and UNIVAR
   b) Joe Andrews – UNIVAR USA
4) Pesticide Safety – Mark Vallier
   a) Training, training, training
      i) Get licensed
      ii) Site specific info important
      iii) Use outside consultants for training
      iv) Lunch & Learn sessions
      v) Hazmat training
      vi) Power tool safety
      vii) Other
   b) Documentation
      i) PPE requirements
      ii) Respiratory protection program
      iii) Exposure notification forms
      iv) Voluntary respiratory equipment areas
   c) Emergency Action Plan
      i) Fire/injury/evacuation
      ii) Chemical spill
      iii) POC
      iv) Hurricane response
      v) Critical workforce
   d) Facility footprint
      i) Color-coded
      ii) Useful for fire dept responders
   e) Security
   f) Pesticide storage facility
      i) Placards
      ii) Eye wash station

iii) Sumps/sump pumps/storage tank
iv) Sprinkler system
v) Strobe lights to indicate pesticide being mixed

g) Everyday safety
i) Spill kits throughout facility
ii) Truck beds are locked with bed shields
iii) Everything labeled
iv) Everything kept clean

h) Handling pesticide
i) Proper PPE for job
ii) Radios
iii) ID

i) Vehicles
i) Numbered
ii) Visible colors
iii) Strobe lights

j) SAFETY FIRST
i) Right equipment
ii) Right info

5) Mosquitoes, CSOs, and Stable Isotopes – Melanie Pawlish
a) CSO
i) Combined sewer overflow system
ii) Stormwater, sewage, industrial waste
(1) Normal conditions - water goes to treatment center
(2) Some rain
(a) Divert water to CSS system
(b) Primary treatment
(c) Released to stream
(3) Lots of rain – untreated water goes right into stream

b) Tanyard Creek Facility
i) Smallest volume capacity
ii) 1955 acres of urban area served
iii) <1/10" rain will cause facility to overflow
iv) Why is this bad
(1) Inorganics
(a) Oils
(b) Metals
(c) Grease
(2) Excess nitrogen
(3) Increased organic content
v) Why have a CSS/CSO system – prevents sewer from backing up into houses during rain events

c) WNV
i) *Cx quinquefasciatus* and *Cx restuans* breed in CSO streams
ii) WNV+ pools appear to be clustered in areas with CSO streams
iii) Human cases also seem to cluster in these areas

d) What is an isotope?
    i) Atoms of the same element have varying numbers of neutrons
    ii) Isotopic signatures – ratio of isotopes in an element
    iii) Stable isotopes – not radioactive
e) What is being used?
    i) Carbon
        (1) C^{12}
        (2) C^{13}
    ii) Nitrogen
        (1) N^{14}
        (2) N^{15}
f) Use mass spectrometry to determine % of different isotopes in CSO and non-CSO water
g) Studies
    i) Mosquito larvae
        (1) Is there a difference between CSO and non-CSO
        (2) Spatial variation
    ii) Adult mosquitoes
        (1) Gravid & CDC traps
        (2) Dispersal
        (3) WNV+ vs WNV- mosquitoes
    iii) Temporal variations – larvae and adults sampled over the season
    iv) Age variations
        (1) Blood meal x2
        (2) Oviposition x2
    v) Conclusions
        (1) We know CSOs yield high populations of immatures – do they disperse as adults?
        (2) WNV+ cluster around CSOs – is this because of the CSO?

6) Delusory Parasitosis – Roxanne Connelly
a) Normal – healthy respect for insects
b) Entomophobia – irrational fear
    i) Anxiety/panic attacks
    ii) Real insects present
c) Delusory Parasitosis
    i) Unshakeable belief
    ii) No insects involved/present
    iii) Symptoms, Waldron (1962)
        (1) Bugs change color
        (2) Bugs infest hair/skin
        (3) Bugs jump
        (4) Bugs follow sufferer
    iv) Symptoms, Hinkle (2000)
        (1) Waxy balls
        (2) Fibers
    v) The sequence

(1) PCO treats house
(2) Person applies pesticides to body
(3) They see a dermatologist
(4) They call an entomologist
(5) This usually occurs multiple times
(6) Web browsing adds to the problem

vi) Typical scenarios
(1) Samples brought in – no insects found
(2) Person has sores from scratching
(3) They want you to visit their home
(4) They insist this is a new insect
(5) Many professionals are consulted
(6) There is a real problem, it just isn't the one described by the person
(7) The whole family and friends can buy into the problem

vii) Lots of time and effort usually involved

viii) Final status of cases is usually unknown – person can not accept any answer but what they "know" is the problem

ix) Commonalities
(1) Research problem
(2) Lots of insects – can't catch them
(3) Defensive

x) What is the cause?
(1) Prescription, OTC, or recreational drugs
(2) Allergies
(3) Psychological issues (OCD?)

xi) Role of the entomologist
(1) Find out if there is a real insect
(2) Need a protocol
(3) Use a form to collect info (Hinkle, 2000)
(4) Remind person an entomologist is not a physician

xii) References
(1) http://edis.ifas.ufl.edu
(2) http://www.ent.uga.edu/pubs/delusory.pdf
(3) GER - http://health.state.ga.us/pdfs/epi/gers/ger1204.pdf

7) Barrier Treatment Study – Trey English
a) Goal – prevent insects from entering an area
i) Localized
ii) Reduce adult populations
b) Benefits
i) Timeliness
ii) Reduced cost
iii) Reduced pesticide use
c) Type of applicators
i) ULV
ii) Electrostatic
d) Measurements

i) Penetration
ii) Deposition on underside of leaf

e) Study set-up
i) Pesticide used: Talstar
ii) AR – 21.8 ml/300m
iii) Droplet cards/dye readers
iv) Hotwire droplet sizing

f) Collecting data
i) Leaf washer
ii) Droplet cards

g) Results
i) Droplet size range: 13-97 μ
ii) Mean deposition
iii) Penetration

h) Conclusions
i) Larger droplets better
ii) High air velocity better
iii) Electrostatic sprayers do not improve barrier spray efficacy
iv) No difference in backpack or truck mounted

16 Oct:
<u>Second Session</u>

1) Challenges of a New Director – Ben Brewer
a) Problems
i) Little support from other divisions
(1) Common question – so when are you going to quit
(2) Took months to get a computer
(3) Hard to deal with personnel issues
ii) Lack of experience
iii) Altamaha Canal
iv) Finances
v) Human resources

b) Issues that arose
i) Altamaha Canal
(1) Very large
(2) Naturalized wetlands
ii) Fuel shortages – biofuel
iii) Tornado
iv) Hurricane
v) Open Marsh Water Management (OMWM)
(1) Large amount of paperwork
(2) Issues with Army Corp
(3) Political issues
(4) Old ditches

c) The usual issues

i) Andrews Island – dredge areas
ii) Saltmarsh mosquitoes
iii) Politics
iv) Ditching issues

d) Community issues
i) Dames of the Revolutionary War
ii) DNR – birds
iii) Island Authority
iv) Rich folks/vacationers
v) Commissioners

e) Biggest problem
i) Lack of time
ii) Too many projects
iii) Bad feelings between agencies

f) Control issues – can be hard to resolve
i) Larvicide – goal is to do mostly this
ii) Adulticide – this is also needed at times
iii) OMWM – needs to be done
iv) Problem
(1) Some people don't want anything done
(2) Some people want the mosquitoes gone
(3) Legal/regulatory issues

g) Media
i) So far so good
ii) Working to get positive publicity
iii) Front page – color
iv) Some reporting issues, but they have been minor

2) Georgia Extension Services – Dr Steve Brown
a) UGA – Land Grant University
i) Made university education available to all
ii) Missions
(1) Teaching
(2) Research
(3) Extension

b) Extension
i) Outreach to community
ii) Extends learning to whole state
iii) College of Agriculture and Environmental Science
iv) County extension agents
(1) Part of university system
(2) Offices in 157 of 159 counties
(3) About 350 county agents throughout state
(4) Extensive training programs
(5) Funding varies from county to county

c) College of Ag/Environ Sci
i) Budget issues

ii) Research programs
(1) #1 within University
(2) #4 in whole US
iii) Cooperative extension services
(1) Funding from a variety of sources
(2) Bring together many agencies
iv) Extension Program
(1) County agents
(2) Specialists
v) 4-H program
vi) Teaching program
(1) Tends to be a small program
(2) Don't have as many students as other programs
(3) Shortage of good Ag people
(4) Working to increase enrollment –
(a) Succeeding
(b) Seeing more female students
vii) 2007 – ranked #1 in university for fund raising

d) State funding issue
i) College will lose money
ii) Determined to overcome problem

e) Identity problem
i) Working on more visibility
ii) Banner programs
(1) Walk Georgia - http://www.walkgeorgia.org/
(2) Water Smart – http://www.hort.uga.edu/extension/mastergardener/WaterSmartDesignforGoldStar.html
iii) Challenges
(1) Utility costs
(2) Difficult to find qualified people
(3) Retirement – getting set to lose as much as 50% of current work force

f) Looking to partner with mosquito control
i) Can get info out quickly
ii) Trained in crisis situations
iii) Contact Elmer Gray

3) NEWS – Mosquito Control Training Manual is available!!!
4) All the News That's Fit to Misrepresent – Joe Conlon
a) AN ASIDE: Hurricane Ike Assistance, Relief Fund – Texas Mosquito Control Association, Box 906, Hewitt, TX 76643
b) Public Relations and Information
i) Email/telephone
ii) Radio and print
iii) Satellite TV interviews
iv) Morning Show with Mike & Juliet (repellents)
v) The Today Show with Matt Lauer (repellents)

vi) >150 million media impressions

c) EU Directive 91/414
   i) Regulates plant chemicals
   ii) Amendments from a risk-based registration (possibilities of harm) to a hazard-based registration (probabilities of harm)
      (1) If it is possible, no matter how unlikely, it is now a problem
      (2) Stricter measures
   iii) Global harmonization of labels
      (1) Labels designed to evoke an emotional response
      (2) Only use DANGER and WARNING
   iv) World Health Assembly Resolution 50.13
   v) WHO had no IPM policy until early 2000s
      (1) They are totally clueless about research on IPM
      (2) Their idea of IPM is no pesticide use
      (3) One problem - grant program is trying to self-perpetuate
      (4) Will this spill over to the US? Possibly

d) Altman vs Amherst NY case
   i) Amherst prevails
   ii) ULV spray does not need a Clean Water Act permit
   iii) Rule being reconsidered by the 6th Circuit Court
   iv) Environmentalists want mosquito control to be permitted to do ULV spraying
   v) Crop producers want all spraying to be non-permitted

e) Endangered Species – proposed rule
   i) Lots of litigation occurring
   ii) Huge legal log jam
   iii) Will prevent use of pesticides in areas until log jam is cleared
   iv) 15 August 2008 – Interagency Cooperation proposed rule
      (1) Reduces impact of ESA regulations/litigations
      (2) Amends definitions
         (a) "Biological assessment"
         (b) "Cumulative effects"
         (c) Expanded "No Effects"
         (d) "Effects of the Action"
         (e) "Reasonably certain" (hazard-based) vs "reasonably foreseeable" (risk-based)
      (3) Essentially tightens up these definitions to make them more specific and less broad-based
      (4) Makes definitions less speculative and more specific
      (5) Also allows other agencies to just review assessments done by other agencies rather than redo them
      (6) Proposed rule shifts effects determinations to other agencies with resources
      (7) 60 day timeline – automatic assumption of no effect
      (8) Biological Opinions often come down to possibilities vs probabilities
         (a) Often based on old information
         (b) Often based on misuses

(c) Often based on unrealistic assumptions
v) Presidential election may change all of this
f) USFWS Mosquito Control Policy
i) May not come out until after election
ii) In the meantime, status quo
iii) Local health authorities will determine if there is a problem needing control
iv) FIFRA Definition
(1) Mosquitoes are a health issue
(2) Doesn't necessarily over-ride NEPA on refuges
v) Current policy: Spray Threshold Criteria = numbers + pathogen presence
vi) Choice of chemicals
(1) Non-target impacts: USFWS
(2) Efficacy: AMCA
(3) New policy states no adverse economic effects – not true
vii) USFWS policy is very reactive, not proactive

5) Industry Spotlight
a) Valent BioSciences – Candace Royals
i) Some new products
(1) New product works in heavily organic areas and saltmarsh
(2) New product for midge control
ii) Now selling dippers
b) Southern Helicopter Leasing – Cliff McGowan
i) Started Nov 2007
ii) On-call helicopter mosquito control service
(1) Inspection
(2) Larviciding
(3) Adulticiding
iii) Require no contracts
iv) Focus is on small counties
v) Work with county to do what is needed
vi) Licensed in GA, FL, SC, LA, AL
vii) Working on TX and NC
viii) Total mobile
(1) Self sufficient
(2) Trailers / support staff

6) Larval Equipment Calibration – Candace Royals
a) Why calibrate
i) Essential to ensure correct application rates
ii) Saves material and money
iii) Assures compliance with label and law
b) Equipment calibration
i) Every piece of equipment is different
ii) Every applicator is different
iii) Habitat needs vary
iv) Calibrating just once does not do the trick
c) Factors

i) Speed of travel
ii) Swath width
iii) Flow rate
iv) Dilution rate
(1) Granular – constant
(2) Liquid

d) Calibration formulas
i) Flow rate = (application rate x speed x swath width)/495
ii) Another

e) Measuring the swath width
i) Nice to have an open area
ii) Visual monitoring - granules
(1) Can put out white rags 5' apart for 30"
(2) Can see how many granules are put out per square foot
iii) Visual calibrations – liquid
(1) Use dye cards
(2) Same procedure

f) Measuring flow rate
i) Liquid
(1) Graduated cylinder
(2) Stop watch
ii) Granular
(1) Catch and weigh
(2) Spray and weigh

g) Need to standardize
i) Repeat calibration throughout season
ii) Calibration should be done by individual applicators

7) Ground ULV and Equipment Calibrations – David Sykes
a) History
i) Thermal fogging
(1) WWII technology (smoke screen generators)
(2) Mixing insecticides into carrying agent (diesel or kerosene) will control insects
(3) Good control in heavy vegetation
(4) Creates traffic hazards
(5) Environmental considerations - oil
(6) 1946 – Todd Shipyard made first thermal fogger
(7) Can see and direct fog
(8) Used about 40 gal per hour
(9) Handheld sprayers developed in the 1960s
ii) ULV
(1) Developed in 1966
(a) Nozzle developed in a joint project between Navy and Dept of Ag
(b) Became the LECO nozzle
(2) Gary Mount presented papers about ULV in the 1970s
(3) Comparable efficacy with thermal fogging

(4) Used about 1-4 gal per hour

b) Thermal vs ULV
   i) Comparable efficacy
   ii) ULV is less offensive and less hazardous
      (1) Less traffic hazard
      (2) Less smell
   iii) Thermal has better penetration
   iv) ULV uses much less volume
   v) ULV technology has become much more efficient
      (1) High pressure
      (2) Rotary atomizers
      (3) Gas handheld
      (4) Electric
      (5) Backpack
      (6) Portable units
      (7) Multi-purpose sprayers
      (8) Truck-mounted
      (9) Aerial applicators

c) ULV maintenance
   i) Scheduled at least every 6 months
   ii) Checklist
      (1) Fluids
      (2) Fittings
      (3) Belts
      (4) Chemical lines
   iii) Cleaned regularly
   iv) Cleaned and stored at end of season

d) Calibration
   i) Determine application rate (product label)
   ii) Verify chemical flow rate
   iii) Verify droplet size
   iv) Calculations
      (1) Based on length x width x speed
      (2) Speed is usually set – 10, 15, or 20 mph
      (3) Acreage is usually set
      (4) Cost per acre
         (a) Cost per gallon x pounds of active ingredient per gallon
         (b) For mixed products add cost of solvent oil
      (5) Active per acre
         (a) Active per gallon divided by 128 (ounces)
         (b) Multiply active per ounce x ounces per minute
         (c) Divide by acres per minute
      (6) Ounces per minute
         (a) Multiply desired active per acre x acres per minute
         (b) Divide by lbs of active per ounce
   v) WHY calibrate

(1) The label is the law
(2) Records must be kept to comply with the label
(3) Will get best results from the chemical applied

vi) Verifying flow rate
(1) Push or pull system?
(a) Orifice – pull machine
(i) Graduated cylinder
(ii) How much comes out when machine is running
(b) Pump – push machine
(2) Check your machine specs
(3) Pumping systems
(a) Types
(i) Flow meters
(ii) SCAMP
(iii) GIS systems
(iv) Leco
(v) Other
(b) Functions
(i) Record keeping
(ii) Locations
(iii) Other

vii) Droplet sizing
(1) Now required on the label
(2) 10-20 μ droplets for cold fogging (ULV)
(3) 1-5 μ droplets for thermal fogging
(4) AIMS or hotwire unit best results
(5) Vendors will come out to site to verify droplet size
(6) Other methods
(a) Laser
(b) Teflon-coated slides

e) Weather issues
i) Strong inversion (cooler air closer to ground) is best
ii) Rain and wind are limiting factors

f) Evaluation of control is very important

<u>Third Session</u>

1) Columbus Health Dept Vector Control – Shawn Taylor
a) History
i) Started about 40 years ago
ii) Located in Environmental Health
iii) Federal grant
iv) Local board of health adopted program
v) Good support

b) Topics
i) Coverage area

(1) 221 square miles
(2) Divided into 2 sections
(3) Fort Benning in area – started working with them to get better coverage

ii) Work functions
(1) April-Oct
(a) Handle complaints
(b) Routine spray routes (mostly larvicide)
(c) Catch basin control
(d) Started surveillance
(2) Nov-March
(a) Rat complaints
(b) Bait sewers (~60/day)
(c) Check for bait acceptance
(d) Also do some roach complaint and control

iii) Chemicals used –
(1) Mosquito control
(a) Larvicide
(b) Adulticide
(c) Surveillance
(i) 5 of each trap
(ii) Trap once a week
(2) Rat control
(a) Maki blocks
(b) Other

2) The Clarke Technical Center – Jim McNelly
a) Located outside of the Chicago area
b) 6 companies within Clarke Mosquito Control
i) Service side
ii) Products side
(1) Chemicals
(2) Equipment
c) Technical Center Overview
i) New product development
ii) CEMM – surveillance lab
iii) Environmental Science
d) New Product Development
i) Largest program
ii) Cost of registration - $20 to 40 million
iii) Key partnerships
(1) Universities
(2) Military – DWFP
(3) Members of industry (agriculture)
iv) Formulations Lab
(1) New products
(2) Tweaking existing products
(3) Analyzing products

v) Pilot Room
(1) Evaluate manufacturing process
(2) Equipment evaluation
(3) Testing programs
vi) Analytical Lab
(1) Quality control
(2) Product testing
(3) Further development
vii) Bioassay Lab
(1) Insectary
(2) Lab testing
(3) Supports field testing at Field Stations
viii) Chem-ID Lab
(1) Vector testing
(2) Vector ID

e) Environmental Science
i) Most work occurs in the field
ii) Product testing support for EPA registration
iii) Technical support to sales and customers
iv) Calibration and characterization of equipment on a large scale
v) Surveillance and quality assurance during emergency spray operations
vi) PESP
vii) Mosquito U

f) Tech Center is the science behind Clarke
g) Contact – Vicki Lubas

3) New Adulticide – Charlie Pate / Bill Reynolds
a) New product for Central Life
b) Active ingredient – etofenprox
i) Been around since the 1980s
ii) Developed for crops
iii) First US registrations – early 2000s
iv) Used in cat & dog control products
v) Central Life acquired rights in 2005

c) Background
i) Not a carbamate
ii) Not a organophosphate
iii) Not a typical pyrethroid
iv) Broad spectrum control

d) Mosquito control
i) Zenivex E20
ii) Non-ester pyrethroid
iii) Ether pyrethroid
iv) Contains only carbon, hydrogen, and oxygen
v) Toxicology
(1) No chlorines – lower LD_{50}
(2) Low mammalian toxicity

(3) Low avian toxicity
(4) Reduced risk under EPA classifications
vi) Sodium channel blocker
vii) Contact or ingestion
viii) Quick permanent knockdown

e) Formulation
i) Oil-based for ULV
ii) No synergist
iii) 1.5 lb per gallon
iv) 20% etofenprox by weight
v) Application rates; 0.00175, 0.0035, 0.007 pounds per acre
vi) Droplet range: 10-30μ
vii) CAUTION

f) Testing
i) Testing done previously under the DWFP
ii) More than 30 trials
iii) 14 mosquito species
iv) Trials throughout US
v) Excellent at all label rates
vi) Standard testing procedures
(1) Caged mosquito trials
(2) Ground ULV application
(3) Droplet spinning impinger
vii) Efficacy
(1) 20 minutes
(2) 1 hour
(3) 12 hours
(4) 24 hours
viii) Weather and flux deposition monitored
ix) Applications made diluted and undiluted
x) Efficacy trials – 2008
(1) 5 locations
(2) Under 10 acres

g) Results
i) July 2008, Palmetto FL
(1) Targeted *Oc taeniorhynchus*
(2) % mortality was good overall
(3) Added fluorescence to spray to look at flux
(4) Low deposition resulted (as expected) in low control
ii) August 2008, Salt Lake Mosquito Control
(1) Targeted species: *Cx tarsalis* and *Cx pipiens*
(2) Great control at mid-level rates throughout all time intervals
iii) Sept 2008, Norfolk VA
(1) Mid-label rates
(2) Used lab reared and local mosquito populations
(3) Good control overall

(4) Low droplet density equaled low mortality

h) Summary
   i) No difference in equipment used
   ii) Mortality good with diluted or undiluted
   iii) Quick permanent knockdown within 20 minutes
   iv) Tested against 14 species
   v) Low toxicity profile
   vi) New tool for the toolbox
   vii) No PBO synergist needed
   viii) No odor
   ix) No aquatic set-backs
   x) For use as ground application or aerially
i) Resistance
   i) Does not appear to be cross-resistance with other pyrethroids
   ii) May be able to be used in areas with pyrethroid-resistant mosquitoes
j) Distributer - ADAPCO
k) www.altosid.com

4) Arboviral Surveillance in Georgia – Danny Mead
   a) Dead bird submissions are down
      i) Funding
      ii) Apathy
      iii) Birds still providing good info
   b) Mosquito pools
      i) Submissions low this year
      ii) Funding decrease
      iii) Fewer counties submitting
   c) Many viruses detected through this testing
   d) Interesting findings
      i) Flanders and WNV
         (1) Early in the year we see Flanders
         (2) Mid season – WNV
         (3) Late season – Flanders
         (4) *Cx restuans* / *Cx quinquefasciatus* association??
      ii) New findings
         (1) South River virus
         (2) Uncharacterized Rhabdovirus (American coot)
         (3) Uncharacterized Orbivirus (*Oc taeniorhynchus*)
         (4) Flanders virus variant (picked up earlier and identified as Hart Park)
      iii) SCWDS – great resource!!!
      iv) Providing a service to Mosquito Control and Public Health
5) A New Option in Midge Control – Elmer Gray
   a) Chironomid midges (muffleheads)
      i) Do not transmit disease
      ii) Difficult to ID and control
      iii) Nuisance problem
      iv) Can be ecologically important

v) Tolerant of poor water quality

b) Life cycle
   i) Nematocera – Family Chironomidae
   ii) Closely related to mosquitoes and black fly
   iii) Very common
   iv) Four life stages: egg, larva, pupa, adult
   v) 4 instars (blood worms)
   vi) Length of life cycle is temperature dependent
   vii) Feed on organic materials
   viii) Found in substrate
   ix) Very high populations
   x) Asynchronous emergence
   xi) Many, but not all, species susceptible to Bti

c) Adults
   i) Short-lived
   ii) Do not feed
   iii) Eggs laid on grass around ponds

d) Control options
   i) Bactimos PT (Bti)
   ii) Newly registered for midge control
   iii) Pellet formulation

e) Efficacy trials
   i) 2006 & 2007
   ii) Man-made ponds
   iii) Bank and boat applications
   iv) Treated and untreated control pond sampled
      (1) 2006 – 5 sampling dates
      (2) 2007 – 6 sampling dates (trial 1)
      (3) 2007 – 5 sampling dates (trial 2)
   v) Marayamu backpack sprayer
   vi) Whole pond application vs band application
      (1) Band –
         (a) 20’ from bank
         (b) Firm sand area
         (c) 3 -6 feet deep on average
      (2) Band applications seems to be effective in these ponds
      (3) Treat every two to three weeks
      (4) Firm sandy bottoms are highly productive
      (5) Mucky areas not as productive - material may be too fine for midges to make tubes
      (6) Pond substrate must be characterized first
   vii) Sampling – Eckman dredge
      (1) 15 samples
      (2) 3 subsamples from each sample
      (3) Washed material through a sieve
      (4) Transfer material to enamel pan

(5) Pick out larvae
viii) Results
(1) 2006 – saw a drop in midge larvae in treated ponds
(2) 2007 –
(a) No control
(b) Product stored in metal container
(c) Got too hot
(d) Lost efficacy
(3) 2007 (trial 2)
(a) New product
(b) Got great control
ix) Summary
(1) ~21 days of control
(2) Got about a 50% reduction

f) Hilton Head Plantation
i) Lots and lots of midges
ii) Band treatment
iii) 2 weeks later – no midges
iv) No complaints from habitual complainer

g) Good results so far
h) New product roll out within last month
i) No easy answers to midge control

6) Adult Mosquito Field ID – Bruce Harrison
a) http://www.gamosquito.org/resources/fguideID.pdf
b) Basic Info
i) No one can field ID all species in a given area
ii) Guesswork based on knowledge and information
iii) Never completely accurate
iv) ID should be confirmed under a microscope
v) Very valuable tool

c) Advantages
i) Provides instant knowledge
ii) Can pinpoint time of day the problem is occurring

d) Important steps
i) Need to know how to tell a mosquito from other Diptera
ii) Need to know the phenology – when species are present
iii) Need to know habitats
iv) Need to know behavior
v) Need to know unique characters

e) Everyone should be able to ID *Aedes albopictus*
f) Characteristics
i) Size
ii) Color
iii) Patterns

7) Mosquito Control Update for South Carolina – LA Williams
a) ~70 different programs within SC

i) Programs run the full gamut of control efforts, similar to GA
ii) State works with programs to help them do control correctly and successfully
iii) State-wide contract for mosquito control products

b) 46 counties
i) Health department in each county
ii) State health department
iii) Mosquito control affiliated with local government, not mosquito control

c) Issues
i) Legal restraints
ii) Politics
iii) Funding issues / economics
iv) Social acceptance

d) Obligation is to the public

e) Program elements
i) Commercial suppliers
(1) Chemicals
(2) Equipments
ii) Good management
iii) Training
iv) Media
v) State Lab

f) Surveillance programs
i) WNV
(1) Birds - 3 WNV+ crows
(2) Mosquito pools – 7 WNV+ pools
(3) No human cases
(4) No horse positives
ii) EEE
(1) 5 EEE+ horses
(2) No human cases
iii) Provides data for quick response against disease
iv) Set up vector specialists throughout state
(1) From environmental health
(2) Trained in surveillance and ID
(3) Provide local surveillance support
(4) Work with local health departments
(5) Programs have continued even with loss of grant money

g) Dept of Pesticide Regulation at Clemson University
i) Good relationship
ii) Require certification
iii) Regulators come to all training sessions

h) IPM focus

i) EDUCATION & TRAINING are a must

j) South Carolina Mosquito Control Association - http://www.scmca.net/
i) Working relationships

(1) South Carolina Association of Counties
(2) Municipal Association of South Carolina
ii) Have been very helpful in getting info out

k) Work with Chatham County Mosquito Control dealing with spoil areas that abut GA border
l) Tire program
i) Money goes for local abatement
ii) Has helped reduce *Ae albopictus* problem
m) Do the right thing, at the right time, for the right reason!

17 Oct:
<u>Fourth Session</u>

1) Adult Mosquito Ecology at Ichauway – Eva Whitehead
a) What is Ichauway
i) Nature Preserve
ii) Southwest GA
iii) Pine and wiregrass
iv) Mandate to study malaria/mosquitoes in area
b) Project
i) Initial – comparison between urban and rural mosquito communities
ii) Changed to adult ecology in rural area
iii) Dilution effect theory – arbovirus prevalence lower in areas with more host diversity
c) Objective
i) Mosquito community make-up
ii) Host feeding
iii) Arboviral prevalence
d) Study sites
i) 8 sites
ii) Located throughout area
iii) Near wetlands, ponds, rivers, and swales
iv) Variety of habitats
e) Data
i) Weather
(1) Temperature
(2) Relative humidity
(3) Rainfall
ii) Canopy cover
iii) Mosquitoes
(1) Once a week
(2) CDC light trap
(3) CDC gravid trap
(4) Resting boxes – blood fed females
(5) Aspirator - blood fed females
f) Lab

i) Separate and ID mosquitoes
(1) Species,
(2) Sex
(3) Number
ii) Pooled
iii) Placed in ultralow freezer

g) Preliminary results
i) Environmental data fluctuations over time
(1) Construct model
(2) Lots of data
ii) Mosquitoes
(1) 30 species found
(2) *Ae vexans* most common at all sites
(3) May 13 – 25 weeks
(4) Total females collected over time
(5) 3000 females collect up through end of Aug
iii) Hurricane Fay
(1) 12-18 inches of rainfall in 4 days
(2) Huge spike in mosquito numbers starting in Sept
(3) Numbers dropped back off in week 20
iv) Species composition
(1) *An crucians* high early in season
(2) *Ps cyanescens* peaked somewhat later
(3) Huge peak in *Psorophora* spp after Fay
(4) Species composition and number varied between sites
v) Further testing
(1) 175 blood fed females
(a) Ae vexans
(b) An quadrimaculatus
(c) Cx salinarius
(d) Ps ferox
(e) A few others
(2) A bunch of pools to test for virus at SCWDS

h) Practical Importance
i) Species map updates
ii) Arbovirus info from a county that has done very little surveillance

i) More to come at AMCA 2009!

2) Mosquito Control Ft Stewart/Hunter Army Airfield – Cpt Hee Kim
a) Problems occur when various groups remain isolated
b) Purpose
i) Importance of surveillance
ii) Problems faced
c) Surveillance
i) Vital for good vector control
(1) Location
(2) Species

(3) Density
ii) Save money

d) Location
i) Big installation – 285,000 acres+
ii) Multi-county location
iii) Large wetland
iv) 2 installations located 30 miles apart
v) Limited personnel doing surveillance

e) IMPORTANT
i) Traps must be located at places that are worth controlling
ii) Remote wetland sites are always over the threshold for control
iii) Don't need to be controlled because no one is out there on a regular basis

f) Info management
i) GPS/GIS
ii) Data logging

g) Communication issues
i) Need to do survey reports
ii) Lack of continuity between personnel
(1) Deployment
(2) Entomologist changes every 3-4 years
iii) Need to communicate with civilian mosquito control as well
iv) Breakdown in communication between:
(1) Complaints
(2) Surveillance
(3) Control

h) Solutions
i) Concentrate trapping where people are located
(1) 7 semi-permanent sites
(2) 3 gravid trap sites
(3) Follow up on complaint calls
(4) 4 pre-established trap sites outside housing area
ii) Focus on vector species
iii) Action threshold
(1) Depends on trap and location
(2) Roughly 15 females in a light traps
iv) Army also issues DEET-based repellent and treated clothing
v) Asked for help from Chatham County Mosquito Control
vi) Used 4 black light traps
vii) Info management
(1) GPS/PDA
(a) Site info captured and stored for each session
(b) Species info stored
(2) GIS and Google Earth used to visualize data
(3) NEED A DATABASE (Access and Excel)
viii) Mosquitoes sent to USA-CHPM for ID and testing
ix) Weekly report sent out – with week comparisons

(1) Set up everything to be automatic
(2) No longer need one person to be there to update the info

x) Cross-training is a vital part of the solution

i) Results
i) Improved communications
ii) Historical data stored
iii) Shouldn't need a learning period when new personnel come on board
iv) Better relationships both on the installations and off

j) What's coming?
i) Modular database
ii) New trapping methods
(1) Alternate CO_2 sources
(2) Need to do comparison study
iii) Shift to more focus on larval control
(1) Operator friendly – can work during the day
(2) Cost-benefit
(3) ~1200 storm drains

k) Conclusions
i) Surveillance provides a guide for control
(1) Recommendations need to be made based on data
(2) Cost-benefit
ii) Allows evaluation of control efforts
iii) Record keeping is vital
iv) Communication is a must
v) Need to integrate new technology
vi) Evaluate, evaluate, evaluate all the time

3) Industry Spotlight
a) Clarke Mosquito Control – Mike Leahy
i) One stop shop
(1) Emergency control
(2) Equipment
(3) Larvicide
(4) Adulticide
(5) Technology products
ii) Research and development
iii) Services
(1) Droplet testing
(2) Calibrations
(3) Aerial surveys
(4) GIS routing
(5) Education
(6) Equipment repair

b) B&G – David Sykes
i) Full range of products and equipment
ii) Product demo – Sentinel GIS
(1) ESRI-based

(2) ArcPad
(3) Modular components
(4) Simplified field data collection
(a) Prepare
(b) Collect
(c) Report
(5) Designed by Electronic Data Solutions

c) Bayer Sciences

4) WNV in Urban Areas: From Chicago to Atlanta – Uriel Kitron / Gonzalo Vasquez
a) Chicago
i) 2001 – some WNV activity
ii) 2002 - >680 human cases of WNV
iii) 2005 and 2006 also big WNV case years
iv) Outbreak years were hot and dry
v) 2001 – 2 foci of WNV+ birds
vi) 2002 – human cases at same foci as WNV+ birds in 2001
(1) Old floodplain areas
(2) Historic mosquito-borne disease areas
vii) Study
(1) Looked at housing, vegetation, socioeconomic status, and land use
(2) Most cases fit into one category
(a) Mostly white
(b) Moderate vegetation
(c) Housing from 40s and 50s
(d) Moderate population density
(3) Higher risk areas characterized by undocumented storm drains, many in people's backyards
(4) 4 years study – will continue for 5 more years
(5) 12 residential areas
(6) 4 "natural" field areas
(7) Variety of mosquito collection tools
(8) Collected birds
(9) Blood meal analysis
viii) Results
(1) Mosquitoes
(a) Rapid rise in MIR
(b) Spatial heterogeneity
(c) Feeding on sparrows, robins, and humans
(2) Looked at bird density/acre
(a) Robins most important
(b) May change later in season
(3) Virus – a lot of variety seen
ix) Conclusions
(a) Important factors
(i) Landscape ecology
(ii) Vector ecology

(iii) Avian host ecology
(iv) Virus evolution
(b) Fine scale variations are important

b) Atlanta
i) Far fewer cases seen in Georgia
(1) Why?
(a) Different bird species involved
(b) Different vector species
(2) Focus on Atlanta
(a) CSS systems
(b) Is there a connection between CSOs and WNV?
ii) Geospatial analysis
(1) Significant clustering of WNV infection rates
(a) High
(b) Low
(2) Working at census tract level
(3) Used 2001-2007 data
(4) Association seen between:
(a) CSOs and WNV cases
(b) Birds
(i) CSOs and WNV+ birds
(ii) Park areas and WNV+ birds
(c) Mosquito density and CSOs
(d) Infected mosquitoes and CSOs

5) Emerging Topics in Entomology in Georgia – Ray Noblet
a) Entomology
i) Insect biology
ii) Insect sciences
b) Many different disciplines involved
c) Insects affect the lives of everyone
d) Applied and research foci
e) Strong economic base
f) Almost all insect species are beneficial
g) Various projects
i) Honey bees
ii) Forensic entomology
iii) Biosecurity/biosafety
iv) Insects in warfare
h) UGA
i) Land Grant school
ii) 5 teaching faculty
iii) 15 research faculty
iv) 5 researchers
v) 9 extension and outreach people
i) Academic programs
i) BSES – BS in Environmental Sciences/Entomology

ii) MPPPM – Masters of Plant Protection Pest Management
iii) Griffin and Tifton campuses

j) Research
  i) Facilities
    (1) Athens – basic comprehensive
    (2) Griffin – urban entomology
    (3) Tifton – agricultural entomology
  ii) Categories
    (1) Insect host/pathogen molecular biology
    (2) BT – applied biotech, biocontrol
    (3) Mosquito endocrinology/genomics
    (4) Insect immunology
    (5) Vector biology
      (a) Insect disease transmission – plants and animals
      (b) Host immune modulation by insect vectors
  iii) Work with industry and other agencies

k) Areas of focus
  i) Urban Entomology
    (1) Home
    (2) Landscape plants
    (3) Turf
    (4) Pest species
      (a) Fire ants
      (b) Native ants
      (c) Termites
  ii) Systematics, Taxonomy, Evolutionary Biology
    (1) Beetles
    (2) Thrips
    (3) Fire ants
  iii) Stream and Wetland Ecology and Environmental Toxicology
    (1) Aquatic insects
    (2) Wetland inverts
    (3) Vector ecology
  iv) IPM
    (1) Using all the best tools available
    (2) Control economically
    (3) Control with minimum of environmental disturbance
  v) Extension programs
  vi) Educational programs
    (1) Public schools
    (2) Community outreach

l) Employment opportunities
  i) Pay scale is good
  ii) Jobs are available

Business Meeting

- Secretary Report
  - 2007 – 86 participants
  - 2008 – 75 participants
- Treasury Report
  - Education Account ~$4000
  - Regular Account ~$5072
- New Board
  - President - Mark Blackmore
  - VP - Candace Royals
  - 1-Year Member: Bobby Moulis
  - 2-Year Member: Shawn Taylor
  - 3-Year Member: Ben Brewer
  - Secretary/Treasurer: Robert Seamans
  - Extension Rep – Elmer Gray
  - Public Health Rep – Rosmarie Kelly
  - Commercial Member – Charlie Pate
- 2009 meeting: Oct 21-23 at Georgia Center in Athens