

MAMCA meeting
Jan 19-21, 2010

Tuesday, January 19, 2010

SESSION 1

- 1) Considering Aerial Programs - Scott Yackel
 - a) Application options
 - i) Scale
 - (1) Large scale
 - (2) Small scale
 - ii) Control approach
 - (1) IPM approach
 - (2) Adulticide or larvicide only
 - iii) Inspections
 - (1) Ground
 - (2) Air
 - b) Specific programs
 - i) Surveillance
 - (1) Better access to difficult areas
 - (2) Faster turnaround on inspection
 - (3) Larger acreage
 - (4) Work with ground inspectors
 - (5) Saves time and money
 - ii) Better “big picture” view for source reduction efforts
 - iii) Adulticide
 - (1) Impacts
 - (a) Public perception
 - (i) Terrorism concerns
 - (ii) Feeling of inability to avoid spray
 - (b) Environment
 - (c) Non-target organisms
 - (d) Air traffic
 - (2) Benefits
 - (a) Timing - much quicker than ground spray
 - (b) Treatment area size
 - (c) Consistent application
 - (d) Less staff
 - (e) Adulticide flexibility
 - (f) Data logging
 - (g) Area flexibility
 - (3) Spray protocols may generate a need for quick response
 - c) Aircraft options
 - i) Vendor advantages
 - (1) No financial investment unless services are needed

- (2) County agency does not have to be aviation-oriented
 - (3) Program has less control
 - (4) Slower response
 - (5) Many requirements for choosing vendors
 - ii) Government- owned advantages
 - (1) Allows for an IPM approach
 - (2) Immediate response possible
 - (3) Program has control of operation
 - (4) Aircraft can be configured for your program
 - (5) Good PR -
 - (a) Use aircraft to help out in emergencies and trainings
 - (b) Use aircraft in educational outreach
 - d) Aerial info
 - i) FMCPA - FL Mosquito Control Pilots Association
 - ii) AMCPA - American Mosquito Control Pilots Association
 - iii) FMCA Aerial Fly-In
 - iv) Equipment guide - FMCA website
- 2) The History of Phragmites in the Eastern US With Some Implications for Mosquito Control - Bob Meadows
- a) What is the big deal
 - i) Huge problem in NE US
 - ii) Will takeover marsh areas
 - iii) Loss of species diversity
 - iv) Changes hydrology
 - b) What happened
 - i) Started with a slow expansion
 - ii) Not quite sure why the sudden explosion
 - (1) Strain mutation?
 - (2) Anthropomorphic effects?
 - (3) Species introduction?
 - c) Figuring out the problem
 - i) Genetic ecology - Saltonstall, 2002)
 - ii) Genetic mutations have occurred
 - iii) M-type introduced to area
 - iv) All Phragmites is now an introduced strain
 - d) How did this happen
 - i) Ballast yard - areas where ships dumped ballast before taking on a load
 - ii) Introduction at Kaighn's Point NJ in the mid-1800s
 - e) Problems
 - i) Introduced species
 - (1) Spread by rhizomes
 - (2) Mats become very thick
 - (3) Dry out the marsh
 - (4) Prevent growth of other species
 - (5) Raise marsh level
 - (6) Fills in small channels

- ii) Native
 - (1) Less dense
 - (2) More species diversity within phrag stands
 - (3) Tend to be higher up in drainage area
- f) Telling the difference
 - i) Native
 - (1) Leaf sheaths loose
 - (2) Dark spots on stem
 - (3) Shorter
 - ii) Introduced
 - (1) Leaf sheaths tight
 - (2) Paler color
 - (3) Very tall and dense
- g) Mosquito issues
 - i) Introduced phrag is very difficult to walk through - hard to do surveys
 - ii) Need to mow inspection trails
 - (1) Mowing creates open areas - does this increase access of mosquitoes and increase breeding
 - (2) Trail placement is critical
 - (3) Area accessed may not be representative of mosquito problem
- h) Dealing with Phrag-dominated marshes
 - i) Mow - time consuming
 - ii) Burn - can be dangerous
- 3) Novel Transmission Cycle for EEE in the Southeastern US - Abelardo Moncayo
 - a) Coastal cycle - cypress swamps
 - i) *Cs melanura*
 - ii) Birds
 - iii) Bridge vectors - *Aedes*, *Coquilettidia*, *Anopheles*, *Culex*
 - b) Inland cycle - hardwood swamps
 - i) Unknown ecology
 - ii) Unknown vectors
 - c) Following up on EEE horse cases
 - i) Very few *Cs melanura* in area
 - ii) TVA found EEE in mosquitoes - *Cx erraticus*
 - d) Study
 - i) Trinidad mosquito trap - hamster baited
 - (1) Arboviral surveillance
 - (2) Vector incrimination
 - (3) Host incrimination
 - ii) Questions
 - (1) Is *Cx erraticus* present? YES
 - (2) Is *Cx erraticus* attracted to rodents? YES
 - (3) Can rodents elicit a viremia? YES
 - (4) Can rodents be infected in the field?
 - iii) Comparison of CDC light traps and Trinidad traps
 - (1) Trinidad traps primarily caught *Cx erraticus*

- (2) Fewer *Cx erraticus* were caught in the Trinidad trap than the CDC light trap
- (3) Diversity was much lower in the Trinidad trap
- (4) Drought issues impacted data
- (5) Recommendation - use CDC light trap initially
- iv) Resting boxes
 - (1) Collected June through September
 - (2) Caught about 2000 blood fed mosquitoes
 - (3) Good data on 5 species
 - (a) *Cx erraticus* - mostly mammals, some birds
 - (b) *An quadrimaculatus* - primarily mammals
 - (c) *Cx nigripalpus* - 2:1 mammals to birds
 - (d) *An punctipennis* - mammal feeder
 - (e) *Cs melanura* - bird feeder
 - (4) Primarily feeding on mammals
 - (a) Mostly horses and deer
 - (b) Some smaller mammals
 - (c) Some reptile feeding - overwintering host??
 - (d) Some bird feeding
 - (5) *Cx erraticus* appears to be a good enzootic and bridge vector
 - (6) *Cx restuans* may also be an important enzootic vector
- e) May be seeing a secondary cycle among small mammals/reptiles and *Cx erraticus* in areas where *Cs melanura* are not found
- f) What about *Cx salinarius* and *Cx nigripalpus*?
- g) Papers
 - i) J Med Entomol 46 (4): 862-865 (2009)
 - ii) Am J Trop Med Hyg 81 (3): ... (2009)
- 4) Sustaining Members
 - a) Leading Edge Associates
 - i) Software applications
 - ii) <http://www.leteam.com/>
 - b) Southern Helicopter Leasing - http://southernhelicopterservice.com/files/SHL_BROCHURE_2008.doc
- 5) Map Vision: Mapping Operations for You and the Public - Jeff Stivers
 - a) From Leading Edge Associates
 - b) http://www.collier-mosquito.org/treatment_schedule.php
 - c) Uses
 - i) Public
 - (1) Public can find out where spraying is being done
 - (2) Complaints can be registered
 - (3) Pending missions can be seen
 - (4) Missions flown within the last week can be seen
 - ii) Colliers Mosquito Control
 - (1) All data are readily available to crew
 - (2) Easy to use
 - (3) Public can not see intranet site

(4) It can be put out to the public as needed

SESSION 2

1) How Black Fly Populations in PA are Affected When Black Fly Control Activities Cease Mid-Season - Andy Kyle

- a) Background
 - i) Program started in 1985
 - ii) Aerial application of Bti for black fly control
 - iii) Largest black fly control program in the world
 - iv) Treat 46 rivers and streams (1600 miles)
- b) Procedure
 - i) Eggs hatch in April
 - ii) Control begins in April or May
 - iii) Control ends in early Sept
 - iv) 3 river basin area contracts
- c) Monitoring and surveillance
 - i) Larval surveillance ~900 sites
 - ii) Adult sampling ~1100 sites
 - iii) Samples taken back to lab and ID'ed
- d) What was new in 2009
 - i) State budget impasse
 - ii) No budget until Oct
 - iii) Black fly program appropriation was slated to be reduced
 - iv) Decision - stop treatments on July 21, 2009
 - v) Continued to do surveillance
- e) What happened in August - 2 weeks after control was stopped
 - i) Citizen complaints began to rise
 - ii) Black fly numbers rose to impossible levels
 - iii) Problems continued after the regular season was over
 - iv) Businesses were complaining of loss of business due to black flies
 - v) Legislative inquiries began - didn't seem to understand the connection between budget cuts and rising black fly populations
- f) What happened with the black fly populations
 - i) Larvae were seen in late Sept and early Oct, even after colder weather had begun
 - ii) Adult surveillance
 - (1) ≤ 10 are tolerable
 - (2) 0-1 are normal after control
 - (3) Considerably more adults were found in 2009 than in the 4 previous years - as many as 600 adults in a sweep net
- g) Implications for 2010
 - i) Budget hasn't increased
 - ii) Control will likely stop early again
 - iii) Black fly populations got a head start due to lack of later season control in 2009

- 2) Surveillance Training for Public Health - Ros Kelly
 - a) Do surveillance
 - b) Keep good records
- 3) Natular XRG Formulation Field Trial on a Former Dredge Spoil Site in Portsmouth, VA - George Wojcik
 - a) Site description
 - i) Phragmites site
 - ii) Old dredge spoil site - last pumped in the early 70s
 - iii) Mosquito species depend on rainfall and vegetation density
 - iv) Ditches all clogged
 - b) Ground spot application
 - i) Mow paths to allow access
 - ii) Ability to control depends on water level
 - c) Natular trials
 - i) Sampling protocol
 - (1) Simple transects
 - (2) Stop at 10 sites - GPS sites
 - (3) Dip 5 times for larvae
 - (a) Find larvae in any of the 5 dips - positives
 - (b) No larvae in any of the 5 dips - negative
 - (4) Sampled 2 times after treatment
 - (5) Ended up making 3 transects since the phrag grows so rapidly
 - ii) Treatment protocol - aerial application of Natular XR
 - iii) Post-treatment
 - (1) 24 hour
 - (a) Dead larvae found
 - (b) Non-targets present
 - (c) Untreated control (UTC) was all positive
 - (2) 3 days
 - (a) No larvae in treated site
 - (b) UTC sites all positive
 - (c) Non-targets present
 - (3) 10 days - sites dry
 - (4) Rainstorm
 - (5) 17 days - same results as day 3 post-treatment
 - (6) 20 days - same results as day 3 post-treatment
 - (7) 24 days - sites dry
 - d) Conclusions
 - i) Effective for multiple species
 - ii) Some residual out to 20 days even after a dry-down
 - iii) Did not see a non-target affect
 - iv) Some minor formulation issues - resolved by Clarke
- 4) *Culex pipiens/restuans* Oviposition Study: Determining Nocturnal Flight Activity - Christian Boyer
 - a) Paper from Massachusetts - optimum flight activity 2 hours after sunset
 - b) Needed to repeat study for PA

- c) 2007 study
 - i) Design
 - (1) Establish trapping sites
 - (2) Gravid traps
 - (3) Total mosquitoes, not species
 - (4) Record temp and wind speed
 - (5) Collected between June and September
 - (6) Collect once an hour
 - ii) Results
 - (1) Peak activity soon after sunset
 - (2) Morning peak also occurred
 - (3) Main activity at around 9 PM with a second smaller peak at 6 AM
 - (4) More data needed
- d) 2008 study
 - i) Some variability - a few sites had pre-sunset peak
 - ii) Most activity between 8 and 11 PM
- e) 2009 study
 - i) Questions
 - (1) How small is the window?
 - (2) Is collecting causing a disturbance?
 - (3) Did setting the trap draw in mosquitoes?
 - (4) Could the starting time and study length be changed?
 - ii) Protocol
 - (1) Set trap before sunset
 - (2) Start collecting one hour before sunset
 - (3) Collect every 15 minutes
 - (4) Collect for 3 hours after sunset
 - (5) Change entire trap at each collection
 - (6) Establish trap sites where high numbers of *Culex* spp were found
 - (7) Collect between July 27th and Aug 24th
 - (8) Broaden study area
 - iii) Results
 - (1) Everything except one *Oc triseriatus* were collected just after sunset or later
 - (2) Most collected within one hour after sunset
 - (3) 10 species caught
 - (4) 98% were *Culex* spp
 - iv) Conclusions
 - (1) Activity limited at 2 hours after sunset
 - (2) Sunset correlates strongly with flight/oviposition activity
 - (3) *Cx pipiens* were collected earlier than *Cx restuans*
 - (4) Bottom line
 - (a) Start treating at sunset
 - (b) Treat a shorter time period of time
- f) Questions for the future
 - i) What happens as the days get cooler?

- ii) What is going on with *Cx pipiens* and *Cx restuans*?
- 5) Sustaining Members
 - a) ADAPCO - Steve Molnar (<http://www.myadapco.com/>)
 - b) Clarke - Jeff Hottenstine (<http://www.clarke.com/>)
 - c) Central Life - Charlie Pate
(<http://www.wellmarkinternational.com/mosquito.htm>)

Wednesday, January 20, 2010

SESSION 1

- 1) Investigations Related to Bti Efficacy and Larval Black Flies - Elmer Gray
 - a) UGA - black fly colony
 - i) Established 1981 at Cornell
 - ii) Moved to Clemson in 1991
 - iii) Now the only established black fly colony in the world
 - iv) Supported by Abbott Labs - now Valent BioSciences
 - v) 9 tanks currently in place
 - vi) Currently over 2 million flies in colony
 - b) Projects
 - i) Basic research
 - ii) Quality control
 - iii) Special requests
 - c) Black fly
 - i) Attach to substrate
 - (1) Silk glands - spin a silk pad
 - (2) Attach by hooks
 - ii) Filter feed in current
 - iii) Indiscriminate filter feeders
 - d) Control
 - i) Bti
 - ii) Challenges
 - (1) Flowing water
 - (2) Habitat change through length of waterway
 - (3) Water quality
 - e) Efficacy Study - Antibiotics
 - i) Susquehanna River
 - (1) Threatened system
 - (2) 2 branches join to form a main stem
 - (3) Many different kinds of input
 - (4) Antibiotic issue (Broderick et al 2006) from agricultural contamination
 - ii) Study protocol
 - (1) Larvae exposed to antibiotics for 48 and 72 hours in shakers
 - (a) Exposed at rates in river
 - (b) Exposed in combination
 - (c) Exposed at higher rates

- (2) Exposed to Bti
 - iii) Results - no loss of efficacy
 - iv) Paper accepted for publication
 - f) Efficacy Study - Turbidity
 - i) Suspended solids causing a reduction of >30% in Bti efficacy
 - ii) Dissolved particles had no effect on efficacy
 - iii) Re-suspension of solids also caused reduced efficacy
 - iv) Data suggest that there may be feeding competition between Bti and suspended clay particles
 - (1) Bti binds to clays
 - (2) However, adding clays to bioassays did not lead to reduced efficacy
 - g) Efficacy Study - Cations
 - i) Could these affect Bti proteins?
 - ii) No effect seen
 - h) Efficacy Study - pH
 - i) Ranges from 7-9 in the river
 - ii) No pH effect was seen during bioassay
 - iii) Some report increased efficacy at higher pH
 - i) Efficacy Study - Algae
 - i) Previous published work shows that green algae can reduce efficacy
 - ii) Appears to be related to particle size
 - j) The work continues!
- 2) AMCA Update: 75 Years of Service - Doug Carlson
- a) History
 - i) Founded in NJ in 1935
 - ii) 1700+ members
 - iii) Broad range of disciplines
 - iv) Goal - promote high level of integrated mosquito management
 - (1) Leadership
 - (2) Advocacy
 - (3) Legislative & Regulatory
 - (4) Education
 - b) Current issues
 - i) CWA/NPDES permit
 - (1) Players
 - (a) NPDES - National Pollution Discharge Elimination System
 - (b) FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act
 - (c) CWA - Clean Water Act
 - (2) Several pesticide problems on the west coast ended in a ruling that pesticide use needed an NPDES permit
 - (3) Pesticide applications had been exempt provided they were in compliance with FIFRA
 - (4) Battle between EPA and Circuit Courts
 - (5) Bottom line - we are likely going to need an NPDES permit to apply pesticides
 - ii) WNV funding

- iii) Wildlife Refuge control
 - c) PESP partner (EPA initiative)
 - d) Webinars
 - e) Publications
 - f) Washington Day
 - g) www.mosquito.org
- 3) Recent Trends in Arboviruses Fund in the US - Janet McAllister
 - a) Many external influences on arbovirus transmission
 - b) Many unknowns
 - i) Vectors
 - ii) Role of incidental hosts
 - iii) Overwintering mechanisms
 - c) Many arboviruses found in the US from 5 different viral families
 - d) Some specifics
 - i) WNV
 - (1) Flavivirus
 - (2) Found in many different habitats
 - (3) Principal vertebrate host - birds
 - (4) Vectors - *Culex* spp
 - (5) Reported from 48 of 50 states
 - (6) Human cases reported from 47 states - no cases in
 - (a) Maine
 - (b) Hawaii
 - (c) Alaska
 - (7) First year reported - 1999
 - (8) Peak year - 2002
 - (9) Average human cases ~3000 per year
 - ii) SLE
 - (1) Flavivirus
 - (2) Vector - *Culex* spp
 - (3) Human cases reported from 42 states, including GA
 - (4) Last large outbreak 1975
 - (5) Average ~102 cases per year
 - (6) Numbers appear to be going down
 - iii) LAC
 - (1) Bunyavirus in the California serogroup
 - (2) Considered a more rural disease
 - (3) Vertebrate host - small mammals (squirrels and chipmunks)
 - (4) Vector - *Ochlerotatus triseriatus*
 - (5) Found primarily in the eastern US
 - (6) Average ~78 cases per year
 - (7) Under-reported
 - iv) Western Equine Encephalitis
 - (1) Associated with irrigated areas and flood plains
 - (2) Vector - *Culex tarsalis*
 - (3) Alphavirus

- (4) Found in the western US
- (5) No human cases since ~1999
- (6) Last significant activity 1987
- (7) Positive mosquitoes and seropositive birds are found
- v) EEE
 - (1) Associated with freshwater hardwood swamps
 - (2) Vertebrate host - birds
 - (3) Enzootic vector - *Cs melanura*, may be others
 - (4) Needs a bridge vector
 - (5) Found in eastern US
 - (6) Average cases ~7 per year
 - (7) Last big outbreak in 2005
- e) Appears to be a downward trend in arboviral diseases in the US over the last couple of years
- f) Some non-endemic arboviruses
 - i) Yellow fever
 - (1) Was found from MA to LA
 - (2) Epidemics occurred from 1793-1905
 - (3) Vaccine available
 - (4) Still endemic in other places in the world
 - (5) Epidemic in US is currently unlikely
 - (a) Rare imported cases with travel history
 - (b) No local transmission
 - ii) Chikungunya
 - (1) Historically found in Africa and NE Asia
 - (2) Primary vector - *Ae aegypti*
 - (3) Primary host - humans
 - (4) Large outbreak in 2006 associated with *Ae albopictus*
 - (a) Vector common in US
 - (b) A number of imported cases reported in US
 - (c) Large outbreak in Italy in 2007
 - iii) Japanese Encephalitis
 - (1) Vaccine available
 - (2) Can infect a number of vertebrate hosts besides humans
 - iv) Rift Valley Fever
 - (1) Disease of humans and livestock
 - (2) Recent outbreaks occurring
 - v) Dengue
 - (1) Vector - *Ae aegypti*
 - (2) Can be transmitted by *Ae albopictus*
 - (3) Outbreaks have occurred recently in US
 - (a) Now a reportable disease
 - (b) Small outbreak in Key West, FL
 - (c) Periodic local transmission in Texas along the border
 - (4) A lot of travel-associated dengue seen in the US
 - (5) Resurgence of disease as *Ae aegypti* eradication programs fail

- 4) Sustaining Members
 - a) Electronic Data Solutions - Mike Swan
 - i) <http://www.elecdata.com/>
 - ii) Sentinel GIS software
 - iii) Programs
 - (1) Forestry
 - (2) Water quality
 - (3) Mosquito control
 - iv) Modular components
 - (1) ESRI platform
 - (2) Desktop application
 - (3) Works with a variety of mobile devices
 - v) Easy to use
 - b) UNIVAR - Joe Andrews
 - i) <http://www.univarusa.com/>
 - ii) Pesticide
 - iii) Spray equipment
 - iv) Represent
 - (1) Curtis DynaFog
 - (2) London Fog
 - c) Bayer Environmental Science - Don Botkin
 - i) Distributed by ADAPCO
 - ii) Many products
 - iii) http://www.bayerprocentral.com/BAYER/CropScience/BackedByBayer.nsf/id/EN_Home

SESSION 2

- 1) A GIS Model for Predicting the Real-Time Risk of Arboviral Transmission in FL - Jon Day
 - a) System
 - i) Arbovirus - SLE
 - ii) Primary vector - *Cx nigripalpus*
 - iii) Amplification
 - (1) Mosquitoes
 - (2) Birds
 - iv) Vector
 - (1) Extreme drought will shut down breeding
 - (2) Extreme flooding will as well
 - (3) Floodwater Culex
 - (4) Oviposition sites are in low-lying areas where periodic flooding occurs
 - b) Setup
 - i) 589 MWTD data recording stations across peninsular FL
 - ii) Can measure rise and fall of ground water as well as other parameters
 - iii) See a lot of variability in water table depth
 - c) Historic data

- i) 1977 - SLE outbreak
 - (1) Water table showed a typical dry season dry down
 - (2) Mid May - June initial wetting
 - (3) Secondary dry down
 - (4) Wet season increase
- ii) 1990 - SLE outbreak
 - (1) Similar profile
 - (2) Defined dry and wet seasons
- iii) Particular interest in the initial wetting period
- d) Data Modeling
 - i) Model water table depth
 - ii) Look at how typical the water table data are for epidemic transmission
 - iii) Turn data into a risk map
 - (1) Take daily values at each MWTD site
 - (2) Graph how closely data match risk model
 - (3) Map data to risk map
- e) Pinellas County Case Study - 2005
 - i) 3 of 5 major SLE epidemics began in this county
 - ii) 2005
 - (1) 18 cases
 - (2) Onset dates - 1 June to 22 Aug
 - (3) 6/3/05 risk map showed high risk in Pinellas County area
 - (4) 8/12/05 risk map showed decreasing risk in area
 - iii) County Mosquito Control tracked virus in mosquito pools and birds
 - iv) WNV
 - (1) Mapped cases against the risk graphs
 - (2) Human cases occurred when data matched model
 - (3) Mosquito populations
 - (a) High in year prior to epidemic
 - (b) Populations skewed to older mosquitoes during epidemic year
 - (4) Sentinels showed positives to match human cases
 - f) What is the effect of human populations density?
- 2) Assessment of Methoprene in Marine Waters After Catch Basin Treatment with Altosid XR Briquets - Gregg Hunt
 - a) Study area - Beaufort County
 - i) 600 sq mi
 - ii) Many foreclosures in area
 - iii) A lot of water and many small islands
 - b) WNV detected in 2003
 - c) Source of mosquitoes largely catch basins
 - i) Plan - survey and treat all catch basins
 - ii) 4000 storm water drainage ponds
 - iii) Evaluated 3-day altosid briquets for treating catch basins
 - iv) Switched to XR briquets due to manpower issues
 - d) Media attention led to concern from environmental groups as to the effect of altosid on marine organisms

- e) STUDY #1 - is there an unintended effect of altsid on marine organisms?
 - i) Study area - downtown business district for the city of Beaufort
 - (1) Several different types of habitat
 - (2) 234 catch basins
 - (3) 16 outfall structures
 - (4) Drain into a primary river
 - (5) Tidal creek and tidal pond
 - (6) Tides are typically 6-9 feet
 - ii) Procedure
 - (1) Locate and map catch basin
 - (2) Treat with one briquet
 - (3) Sample outflow water at 13 collecting sites after rainfall
 - (4) Track concentrations of methoprene over time (ppt)
 - iii) Results
 - (1) Pretreatment - no methoprene detected
 - (2) During the following 6 months
 - (a) Methoprene was detected at only 4 sites
 - (b) Amounts were in parts per trillion
 - (3) 17" of rain in area
 - (4) Toxicology studies
 - (a) Crustaceans: Grass shrimp and ...
 - (b) Very sensitive non-target
 - (c) Amounts of methoprene that affect shrimp during toxicology studies are much higher than that found during study
 - (d) Methoprene degrades rapidly in sunlight
- 3) Mosquito Control Management on National Wildlife Refuges Along FL's Indian River Lagoon - Doug Carlson
- a) 2 NWR refuges in area
 - i) Merritt Island
 - (1) 140K acres
 - (2) Salt marsh
 - (3) Maple bay swamps
 - (4) Grass marshes
 - ii) Pelican Island
 - (1) 5300 acres
 - (2) Mangrove swamps
 - (3) Disturbed uplands
 - b) Indian River Lagoon
 - i) Lagoonal estuary
 - ii) 156 miles long
 - iii) 5 inlets to Atlantic Ocean
 - iv) Very diverse habitat and plant and animal life
 - c) Impoundment management
 - i) 40,000 acres
 - ii) Created in 1950s and 60s
 - iii) Flooded during mosquito season

- iv) Eliminates egg laying sites
- v) Drawbacks
 - (1) Interferes with movement of water
 - (2) Changed habitat
- vi) Benefits
 - (1) Resident fish populations thrive
 - (2) Can be managed for waterfowl
 - (3) Wading birds thrive
- d) Mosquito control in area requires good cooperation between the NWR and the local mosquito control agency
- e) Concerns from draft policy concerning control on NWR
 - i) What constitutes a health threat
 - ii) Determination of “no economic impact”
 - iii) These NWR are adjacent to residential areas
 - iv) Loss of ability to control in these areas will have an large impact on quality of life in residential areas adjacent to the NWR
- 4) Sustaining Members
 - a) Valent BioSciences - Jim Andrews
 - i) VectoMax -
 - (a) Combination of Bti and *Bacillus sphaericus*
 - (b) Toxins are fused together to prevent preferential feeding
 - (2) Studies show residuals of up to 10 weeks
 - (3) Seeing an IGR-like effect
 - ii) ULV spray technology for larviciding to combat *Ae albopictus* in containers
 - (1) Several studies are ongoing
 - (2) Vectobac
 - iii) <http://www.valentbiosciences.com/>
 - b) FourStar - Bill Mintz
 - i) Microbial products
 - ii) Create unique formulations
 - (1) 45 days control
 - (2) 90 days control
 - (3) 180 days control
 - iii) Objectives
 - (1) Long-lasting
 - (2) Primarily urban habitats
 - (a) Catch basins
 - (b) Swimming pools
 - iv) Bs to Bti ratio: 6% to 1%
 - (1) 3 sizes
 - (2) Dual action release technology
 - v) Distributed by ADAPCO

SESSION 3

- 1) The Clean Water Act and Mosquito Control: Past, Present, and Future - Joe Conlon

- a) History
 - i) Passed after the Cuyahoga River caught on fire
 - ii) 1972 - Restore and maintain chemical integrity of navigable waters
 - iii) 1973 - FIFRA defines navigable waters
 - iv) The government is currently seeking to remove the term “navigable waters”
- b) Comparing FIFRA and CWA
 - i) FIFRA
 - (1) Cost/benefit risk-based
 - (2) Fine - \$7000/incident
 - (3) No citizen suits
 - ii) CWA
 - (1) No cost/benefit
 - (2) Hazard-based
 - (3) Fine - \$37000 per day
 - (4) Citizen suits
- c) Pesticide General Permit (PGP)
 - i) Notice of Intent (NOI)
 - (1) Type or scale of application
 - (a) Feds have no idea what this will be
 - (b) Situation very fuzzy at the moment
 - (2) Identify the responsible entity
 - (a) Contact info
 - (b) Description of entity
 - (c) Type of discharge
 - (d) Receiving stream(s)
 - (3) 25(B) not exempt
 - ii) Technology-Based Effluent Limits (TBEL)
 - (1) IPM plan based on BMP
 - (2) Assumed to be best technology
 - iii) Water Quality-Based Effluent Limits (WQBEL)
 - (1) States that if TBELs are met, WQBELs are met
 - (2) Some very fuzzy language included
 - iv) Monitoring
 - (1) Required
 - (2) Visual??
 - (3) Enhanced??
 - (4) Frequency and timing
 - (5) No ambient water quality testing foreseen - yet
 - v) Annual reporting
 - (1) Required
 - (2) Accessible by the public
 - (3) Types, amounts, locations
- d) General NPDES permit
 - i) Based on writer’s best professional judgment
 - ii) Open to public comment
 - iii) EPA oversight

- e) Endangered Species Act will come into play
- f) Schedule
 - i) April/May 2010
 - (1) Draft permit
 - (2) Public comment
 - ii) Dec 2010 - final permit issues
 - iii) www.epa.gov/npdes/training
- g) State of Washington Draft Permit
 - i) Coverage not needed:
 - (1) Retention ponds if no discharge within 2 weeks
 - (2) >5 acres constructed water body
 - (3) Inland farm pond
 - (4) ...
 - ii) Surveys
 - (1) Larval dips
 - (2) Representative sampling
 - (3) Use of temephos restricted
 - iii) Notification
 - (1) Public notice in a newspaper ≥ 10 days before first application
 - (2) Must provide maps
 - (3) NWR - 24 hour notification
 - iv) Conditions for application
 - (1) Larvicide
 - (a) Must not cause long-term environmental harm
 - (b) 1 larva/pupa per 3 dips needed
 - (c) List of allowed larvicides
 - (2) Adulticide
 - (a) Not allowed for nuisance mosquito control
 - (b) Set season, April 1 - Oct 1
 - (c) ULV
 - (d) Follow label
 - (e) Authorized adulticides
 - (f) Do recognize need for resistance management
 - (3) Reporting
 - (a) File online
 - (b) Signed letter must be on file
 - (c) Keep records for 5 years
 - (4) Testing required
- h) BMP - AMCA
 - i) <http://www.mosquito.org/secure/upload/articles/BMPsforMosquitoManagement.pdf>
 - ii) Components
 - (1) Surveillance
 - (2) Mapping
 - (3) Action thresholds
 - (4) Physical control/source reduction

- (5) Biological control
- (6) Chemical control
- (7) Efficacy/resistance monitoring
- (8) Education and community outreach
- (9) Record keeping
- i) NPDES permit
 - i) This will be a nightmare as the environmental groups become involved
 - ii) One mosquito control agency has already been sued for spraying without a permit EVEN THOUGH NO PERMIT YET EXISTS
 - iii) Supreme Court has been petitioned about the 6th Circuit Court's decision
 - (1) If accepted, oral arguments by Oct
 - (2) If denied, mandate goes into effect 9 April 2011
 - iv) Bottom Line - we will have permits
 - (1) EPA will try to make permit as easy and unobtrusive as possible
 - (2) Environmental activities will begin filing appeals to shut down mosquito control
- 2) A Global Perspective on the Renewed Interest in Public Health Pesticides - Cpt Stan Cope
 - a) Some of the groups involved
 - i) Public Health Pesticide Consortium (PHP)
 - (1) Mission: ensure availability of effect public health pesticides
 - (2) 8 Federal agencies represented
 - (3) Priority issues include creating incentives, promote project development, and develop documents supporting public health pesticide use
 - (4) <http://www.lmca.us/program%20pdf%20files/2007/1%20300%20-%20315%20mcallister.pdf>
 - ii) EPA
 - (1) Recognize the need for public health pesticide use
 - (2) International workshops to promote development of new products
 - (3) www.iphpw.org
 - (4) Working on setting up a test case
 - (5) Agricultural model exists
 - iii) Innovative Vector Control Consortium
 - (1) Gates Foundation
 - (2) Led by the London Scholl of Tropical Medicine
 - (3) Goal: delivery of new tools and product for public health pest control
 - (a) Develop a new portfolio of pesticides- repurposing current chemicals
 - (b) Focus on dengue and malaria control
 - (4) <http://www.ivcc.com/>
 - iv) Deployed Warfighter Protection Research Program
 - (1) <http://www.afpmb.org/dwfpresearch.htm>
 - (2) Administered by Armed Forces Pest Management Board
 - (3) Area of emphasis
 - (a) Novel insecticide chemistries/formulations
 - (b) Personal protective systems

- (c) Application technology
- (4) DWFP competitive grants
- (5) Many accomplishments
 - (a) Barrier spray work
 - (b) Permethrin clothing treatment process
 - (c) Improving residual treatments for materials
 - (d) Filth fly control
 - (e) Basic research on control issues
 - (f) Others
- v) Inter-Regional Project 4 (IR4)
 - (1) <http://ir4.rutgers.edu/>
 - (a) <http://www.entm.purdue.edu/IR4/>
 - (b) <http://www.csrees.usda.gov/fo/ir4minorcroppestmanagement.cfm>
 - (2) Variety of ongoing projects
- b) Many groups working together to keep public health pest control a viable reality
- 3) Identifying Females of *Ochlerotatus atlanticus* and *Oc tormentor* and Similar Species - Bruce Harrison
 - a) Needed specimens with associated larval and pupal skins
 - b) Species Identification
 - i) *Oc atlanticus* and *Oc tormentor*
 - (1) Similarities
 - (a) Median pale longitudinal stripe with straight margins on scutum
 - (b) Scales on head narrow
 - (c) Median pale longitudinal stripe on scutum
 - (d) Scales on head narrow
 - (e) Larval color patterns are the same
 - (2) Differences
 - (a) Can be separated using male genitalia
 - (b) Can be separated using larvae
 - (c) Female characteristics
 - (i) Head scale arrangement
 - 1. Dark scales behind eye
 - a. *Oc atlanticus* - reach eyes on both sides
 - b. *Oc tormentor* - do not reach the eyes
 - (ii) Width of median longitudinal white stripe on scutum just before prescutellar area
 - 1. *Oc atlanticus* - width remains the same throughout
 - 2. *Oc tormentor* - width narrows before it reaches the prescutellar area
 - ii) *Oc infirmatus*
 - (1) Pale scales on thorax do not go to prescutellar area
 - (2) Usually rubbed
 - (3) Larval color different than *Oc atlanticus* and *Oc tormentor*
 - iii) *Oc dupreei*
 - (1) Stripe wider, margins not straight

- (2) Tiny species
- (3) Head scales are wide
- (4) Males have all pale scales on scutum
- c) DNA analysis is being done
 - i) Hope to have primers for genetic analysis
 - ii) Paper should be forthcoming
- 4) Sustaining Members
 - a) Curtis Dyna-Fog - Matt Tandy
 - i) Pesticide application equipment
 - (1) >75 different models
 - (2) Handheld to truck mounted
 - (a) ULV and Thermal
 - (b) Electric and gasoline
 - (c) Truckmount options
 - (i) GPS
 - (ii) Varying HP
 - (iii) Different pump types
 - (iv) Digital tachometer
 - (v) Others
 - (3) Traps
 - (a) UV
 - (b) Incandescent
 - (c) CO₂
 - ii) <http://www.dynafo.com>
 - b) AMVAC - Peter Connelly (<http://www.amvac-chemical.com/amvacchemical.html>)
 - c) Summit Chemical - Jonathan Cohen (<http://www.summitchemical.com/>)

SESSION 4

- 1) Efficacy of Barrier Treatments on Natural populations of Mosquitoes and Sand Flies
 - Ken Linthicum
 - a) Geared towards protecting military on deployment
 - i) Hot/dry environments
 - ii) Sparse vegetation
 - b) Mosquitoes and flies
 - i) Study areas
 - (1) California desert
 - (a) Artificial enclosure study
 - (i) Barrier treatment
 - (ii) Procedure
 - 1. Several different types of equipment
 - 2. Monitored weather stations
 - 3. Collected mosquitoes using light traps
 - 4. Bioassay using *Cx tarsalis*
 - (iii) Results

- 1. Significant reductions in mosquito populations after treatment
 - 2. Control for about a month
 - (iv) Conclusions - barrier treatment on netted enclosures successfully reduced mosquito populations
 - (b) Treating vegetation showed similar results
 - (2) Camp Blanding, FL
 - (a) Similar results seen with treated netting
 - (b) Very different environment
 - ii) Conclusions
 - (1) Good mosquito reduction of target species
 - (2) Treating either fabric and vegetation will reduce mosquito numbers
 - (3) Also useful in fly control
- c) Sand flies
 - i) Material treated prior to shipping to site
 - ii) Significant reduction of sand flies up to 196 days after treatment
- 2) The Disaster Process and the Importance of Documentation During the Recovery Phase - Gary Rice and Robin English
 - a) Disaster declaration process (Gary Rice)
 - i) Where does it all begin
 - (1) Local damage assessment - local state of emergency
 - (2) State of emergency declared - freezes up state resources
 - (3) Federal disaster declaration
 - (a) FEMA comes in
 - (b) Reassessment is done
 - (c) Must meet per capita threshold for public assistance
 - (i) At state level - for any assistance
 - (ii) At county level - for assistance to a specific county
 - (d) Thresholds set for each fiscal year in Oct
 - ii) Documentation
 - (1) Most important thing to be done to get money back
 - (a) Overtime
 - (b) Materials
 - (c) Equipment
 - (2) Equipment and personnel MUST match
 - iii) Preliminary damage assessment
 - (1) Completed ASAP after life safety issues have been completed
 - (2) Paperwork sent to OHS-GEMA
 - (3) Work with field coordinator
 - iv) Issues to consider
 - (1) Roads
 - (2) Bridges
 - (3) School closures
 - (4) Water systems
 - (5) Sewage issues
 - v) Information helps show FEMA that the problem is too big for the county or the state to fix

- vi) Vector control
 - (1) Category B - emergency protective measures
 - (2) Removal of health and safety hazards
 - (a) Health hazard
 - (b) Verification is required
 - (c) Public health must be involved
 - (3) Process
 - (a) Contact - good to know who these people are before an emergency
 - (i) County EMA Director
 - (ii) State EMA Field Coordinator
 - (b) Coordination between Public Works and Vector Control
- b) Documentation During the Recovery Phase (Robin English)
 - i) Important notes
 - (1) Complete your own paperwork
 - (2) Provide proof at time of submittal
 - (3) Document, document, document
 - (a) Include complaint info
 - (b) Include larvicide given to the public
 - (c) No documentation will go to waste
 - ii) FEMA will only reimburse the difference in your vector control costs
 - iii) Need evidence of a problem
 - iv) FEMA will consult with the CDC
 - v) You must be prepared to take action prior to reimbursement
 - vi) No guarantee of reimbursement
 - vii) Documents required
 - (1) Current data
 - (a) Population numbers
 - (b) Arboviral data
 - (2) Data from past 3 years
 - (a) Mosquito surveillance data
 - (b) Arboviral information
 - (c) Work orders for mosquito control
 - (d) Labor - Employee hours
 - (e) Equipment use documentation
 - (f) Pesticide use
 - (3) Post-treatment data
 - (4) Public Health Declaration
 - (5) Map showing areas of need
 - viii) Data collected
 - (1) Keep good records before, during, and after the disaster
 - (2) Don't try to put too much info on any one sheet - you will make mistakes
 - ix) Websites of interest
 - (1) FEMA Equipment Rates
 - (2) FEMA forms
 - (3) State emergency management info
 - (4) FEMA Vector Policy

- 3) Importance of Droplet Knowledge - Bill Reynolds
 - a) Why do we calibrate and measure droplets
 - i) Historically, certain products caused paint spotting on automobiles
 - ii) Early research discovered certain drop sizes were more efficacious
 - (1) Too heavy: non-target mortality
 - (2) Too light: no deposition of product
 - iii) Various studies
 - (1) Study in 1970
 - (a) Relationship of minimum lethal dose to optimum droplet size
 - (b) Lethal dose contained in an 18 micron droplet
 - (c) Too large of a droplet wastes product and money
 - (2) Droplet size effects drift
 - iv) Droplet density is the inverse cube of the diameter in microns x 8
 - (1) Smaller droplets waste less product
 - (2) Have a higher probability of impinging on a mosquito - to a point
 - b) Benefits of smaller droplet density
 - i) Better kill
 - ii) Better dispersal
 - iii) Less product waste
 - c) What are the driving forces now?
 - i) New label language requires info on $Dv_{0.1}$, $Dv_{0.5}$, and $Dv_{0.9}$
 - ii) XF (extra fine) droplet spectrum required
 - iii) Relative span - distribution of droplets in curve
 - d) Droplet collection methods
 - i) Spinning impingers
 - (1) Good for ground and aerial
 - (2) Not effective for collecting far field or downrange smaller droplets
 - (3) Biased
 - (4) Various sized slides for different purposes
 - ii) Cascade impacter
 - iii) Silicon
 - e) Measuring droplet spectrum
 - i) By eye using a microscope ☹
 - ii) DC-III hotwire
 - iii) DropVision systems
- 4) LAC in Western North Carolina - Brian Byrd
 - a) Background
 - i) Principal vector - *Ochlerotatus triseriatus*
 - ii) Isolated in 1960 in LaCrosse, WI
 - iii) Pediatric illness
 - iv) Low case mortality
 - v) Substantial economic burden
 - b) LAC hot spots seen in the US - PLoS One study
 - c) NC data
 - i) Clear focus in western part of state
 - ii) Hoping to do some additional risk studies

- iii) Increase in cases seen since 1996 with peak in 2005
 - d) LAC is very under-reported
 - i) Szumlas et al. 1996, antibody study
 - ii) High risk of transmission
 - e) Life cycle
 - i) Small mammals - amplifying host
 - ii) Vertical transmission occurs (transovarial)
 - iii) Venereal transmission occurs
 - iv) Humans are likely dead-end hosts
 - v) Vector Competence
 - (1) *Oc triseriatus* most competent (Hughes MT et al. J Med Ent. 2006.43 (4): 757-61)
 - (a) Tree hole breeder
 - (b) Will breed readily in tires
 - (2) Evidence that *Ae albopictus* may be involved in transmission (invasive species)
 - (3) *Oc japonicus* is competent in the lab (invasive species)
 - f) Studies done on WCU Campus
 - i) Ovitrap collections
 - (1) Show that species in area are primarily invasive species
 - (2) Change from historic data
 - ii) Morphological studies for ID of damaged adult *Aedes/Ochlerotatus* spp
 - iii) Molecular methods for identifying container-breeding mosquitoes
 - g) Future studies
 - i) Adult age structure/composition
 - ii) Barrier spray effectiveness
 - iii) Host seeking patterns and preferences
- 5) Hand-Held and Truck Mounted Application of Bti to Control Container Breeding Mosquitoes - LT James Dunford
 - a) Reasons for this study
 - i) Would be more time efficient
 - ii) Population reduction prior to adult emergence
 - b) Purpose
 - i) Evaluate ability to control larvae using ULV application
 - ii) Look at mortality and product penetration
 - c) Methods
 - i) Bti - efficacy known
 - ii) Various equipment evaluated
 - iii) Evaluated droplet size
 - iv) Used *Aedes albopictus* in study
 - (1) Larvae placed in cups
 - (2) Cups placed in rows
 - (3) Field plots had varying vegetation density
 - (4) Cups placed at varying distances from applicator
 - d) Summary
 - (1) Particle deposition was usually low in areas with low mortality

- (2) Shape/size of larval habitat affected particle penetration as did vegetation
- (3) Deposition decreased with distance from sprayer
- (4) Results vary depending on equipment used
- (5) Environmental factors
 - (a) Weather conditions were a big factor
 - (b) Humidity affected spray distance
- (6) Droplet size is important
- (7) Dilution rates affected results
- e) More work is needed
- 6) Sustaining Members: AllPro Vector Group - David Sykes
 - a) Now selling directly
 - b) Parent company - big formulator
 - c) Products for 2010
 - i) Evoluer
 - ii) Provect - granular or liquid
 - iii) Aqualuer -
 - (1) Orange oil based
 - (2) Very stable mixture
 - iv) Envion - oil or water dilutable
 - v) London Fog equipment
 - (1) GPS capability
 - (2) ADAPCO monitor is compatible
 - d) www.allprovector.com

Thursday, January 21, 2010

SESSION 1

- 1) The Armed Forces Pest Management Board Web Site: Sine Qua Non of Cyber Entomology - Rich Robbins
 - a) www.afpmb.org
 - i) 99% of material is open access
 - ii) Webmaster - David Hill
 - b) Home page
 - i) Google search specific for the website
 - ii) What's new column
 - (1) Frequently updated
 - (2) Shows papers of particular significance to vector biologists
 - (3) Also shown announcements
 - (4) Items of particular importance are archived on bulletin page, which is crawled by major search engines
 - iii) Multimedia column
 - (1) Videos
 - (2) Images
 - (a) Link to submit an image to the database

- (b) Useable images - follow copyright laws
- (3) Resource column
 - (a) Living hazards database
 - (i) Most frequently visited page
 - (ii) Info on venomous animals
 - 1. Alphabetically by animal
 - 2. By country, then alphabetically by animal
 - (b) Walter Reed Biosystematics Unit
 - (c) Publications database
 - (i) Publications
 - (ii) Interactive teaching tools
 - 1. Free DVD copies available
 - a. Mosquito larvae
 - b. Mosquito adults
 - 2. Free CD copies available - tick ID
- (4) Bulletin page
 - (a) Items of particular importance are archived here
 - (b) One for each year
 - (c) Takes the place of the old Technical Information Bulletin
- iv) Literature Search -
 - (1) Free
 - (a) AFPMB literature database
 - (b) WRBU literature database
 - (2) Also have access to other databases
 - (a) Can create a bibliography of papers on a specific topic
 - (b) Will get article, create a pdf, and send it out to the researcher
 - (3) Request that researcher send any useful info - published or unpublished - for inclusion on site
- c) Disease Vector Ecology profiles
 - i) By country
 - ii) Maintain hard copies as well
- d) Technical Guides
 - i) Manuals
 - ii) Focus on control and management
 - iii) Not available in hard copy
 - iv) Formally Technical Information Memorandums
- 2) Educational Programming at Chatham County Mosquito Control - Bobby Moulis
 - a) History
 - i) Agency established in 1956
 - ii) Did limited out-reach from the very beginning
 - iii) History of vector-borne diseases in Savannah
 - b) Education program
 - i) Out-reach occurs in the off season
 - ii) Focus on grade school kids
 - iii) Also work with local colleges
 - iv) Give out promotional items

- v) Educational brochures available
- vi) Career Day
 - (1) Try to bring larger equipment
 - (a) Helicopter
 - (b) Scooter trailer - can be set up as an educational exhibit
 - (2) Use lots of visual aides
 - (a) Mosquito larvae
 - (b) *Gambusia* spp
 - (c) Light trap stand
- vii) On-site visits
 - (1) Show off the facility
 - (2) Give talks about various topics depending on age group
- c) College internship program
- d) Local Events
 - i) Annual
 - (1) Earth Day
 - (2) Hurricane Awareness Day
 - (3) National Government Week
 - ii) Many others
- e) Beekeeper out-reach
 - i) Attend meetings
 - ii) Visit sites
 - iii) Map areas for no-spray
 - iv) Spray calls for backyard beekeepers
 - v) One-on-one meetings
- f) Media out-reach
 - i) Web-based mosquito forecast
 - ii) Local morning news show - usually associated with a problem
- 3) PA Dept of Environmental Protection Lab Operations - Mike Hutchinson
 - a) What happens to PA mosquitoes when they get to the lab?
 - i) Receiving process
 - (1) Samples in barcoded bottles
 - (2) Box is bar-coded
 - (3) Samples shipped on dry ice
 - ii) Receiving screen
 - (1) Barcode data are uploaded to database
 - (2) Field info uploaded by surveillance person
 - (3) Database flags samples from
 - (a) Positive counties
 - (b) Counties with large numbers of vectors submitted
 - iii) Samples placed into ULV freezer
 - iv) Cold chain maintained
 - v) Identification process
 - (1) Include non-*Culex* species when a county is positive
 - (2) Drop down menus for entering ID info
 - (3) Check boxes to indicate mosquitoes kept for side projects

- (4) Quality control pop-ups included to let interns know to consult a taxonomist about the ID
 - (5) Samples placed into barcoded pool vials that correspond with original barcode
 - vi) Testing process
 - (1) 90 pools per test run
 - (2) Molecular testing
 - (3) BSL-3 lab
 - (a) Work under biosafety cabinet maintaining the cold chain
 - (b) Place BBs
 - (c) Vortex vial
 - (d) Add buffer solution
 - (e) Re-vortex
 - (f) Centrifuge
 - (g) Transfer to 96-well block containing lyses solution
 - (h) Extract RNA
 - (i) RT-PCR
 - (i) Prepare master mix, probes, and primers in new well plate
 - (ii) Add RNA samples to new well plate
 - (iii) Add controls
 - (iv) Taqman - ~30 minutes
 - 1. Amplification
 - a. Polymerization
 - b. Strand displacement
 - c. Cleavage
 - d. Polymerization complete
 - 2. Results in graph form
- b) Other projects
 - i) Test pools for other less common viruses
 - ii) Molecular ID of blood meals
 - iii) Molecular ID of specific mosquitoes species
 - (1) Spot check on *Culex* spp ID
 - (2) Differentiate members of *Anopheles* complexes
 - iv) Collaborate with other researcher on a variety of projects
 - v) Photographic key of mosquitoes
 - vi) Lots of black fly work

SESSION 2

State Reports

- 1) DE - Robert Meadows
 - a) Weather
 - i) Dry winter, early spring
 - ii) Heavy rains after leaf-out
 - iii) Wet summer

- iv) No hurricane activity
- b) Arbovirus
 - i) WNV - low activity
 - ii) EEE - no activity
- c) Budget cuts continuing - loss of employees
- 2) MD - Jeannine Dorothy
 - a) 23 counties
 - b) Programs in 22 of the counties
 - c) Budget cuts - loss of positions
 - d) *Ae albopictus* is a large and increasing problem
 - e) Weather
 - i) Similar to Delaware
 - ii) Lots of offshore winds and high tides
 - f) 3rd highest airspray year ever due to saltmarsh mosquitoes
 - g) Limited *Gambusia* release
 - h) Some WNV activity - lowest since 2001
 - i) Media activity in early June
- 3) NC - Walker Rayburn
 - a) Arbovirus activity
 - i) WNV
 - (1) One positive sentinel chicken
 - (2) No other activity
 - ii) LAC
 - (1) 11 human cases
 - (2) Down from previous year
 - iii) EEE
 - (1) Lots of horse cases
 - (2) Sentinel chicken positives
 - (3) 5 mosquito pool positives
 - (4) 1 human case
 - b) Weather
 - i) Coming out of a drought
 - ii) Amount of rain varied
 - c) Number of programs is shrinking
 - d) No longer in a drought - 2010 will be an interesting year
- 4) PA - Mike Hutchinson
 - a) Surveillance and Testing
 - i) Mosquitoes
 - (1) Surveillance
 - (a) 150 collectors at county level
 - (b) Primarily use gravid traps
 - (c) Collected over a million specimens from 46 species
 - (d) 5 species represented 80% of specimens collected
 - (i) *Cx restuans*
 - (ii) *Cx pipiens*
 - (iii) *Oc trivittatus*

- (iv) *Ae vexans*
 - (v) *Oc japonicus*
 - (2) Testing
 - (a) Primarily tested *Culex* spp
 - (b) Tested about half of mosquitoes tested
 - (c) 311 positive pools
 - (d) Average MIR for *Cx pipiens* 2.26 (5-year)
 - (e) Lowest MIR since 2004
 - ii) Avian surveillance
 - (1) Limited to birds of prey and corvids
 - (2) 10 positives
 - iii) Horses
 - iv) Human cases
 - b) Funding is dropping
 - c) 2010
 - i) Mosquitoes
 - (1) Hope to increase gravid trapping
 - (2) Increase SLE surveillance
 - (3) Reduce June testing
 - ii) Black fly
 - (1) May have to end control early again
 - (2) See Andy Kyle's talk
 - d) www.pavectorcontrol.org
- 5) SC - Jeff Cary (Tammy Brewer)
 - a) Weather
 - i) Drought
 - ii) Rain came
 - iii) No hurricane activity
 - b) Surveillance
 - i) Mosquitoes
 - (1) Primarily gravid and CDC light traps
 - (2) Tested 27850 mosquitoes
 - (a) 17 WNV+ pools
 - (b) No other viruses reported
 - ii) Horses
 - (1) WNV - 1
 - (2) EEE - 16
 - iii) Birds - 2 WNV+
 - iv) Human cases - 3 WNV+
 - c) Peak year for WNV 2003
 - d) EEE appears to be building
 - e) Annual Meeting
 - i) Hickory Knob State Park
 - ii) Nov 3-5, 2010
- 6) VA - Kirby Foley
 - a) Budget issues

- i) Northern VA - RAMP test (WNV only)
 - ii) Tidewater Region - tested for EEE and WNV (PCR)
 - b) Weather - similar to everybody else
 - c) Testing
 - i) WNV - saw an increase in positives
 - (1) Mosquitoes - 133 positive pools
 - (2) Birds - no testing
 - (3) Sentinel chickens - 3
 - (4) Horses - 3
 - (5) Human - 4 cases, no fatalities
 - ii) EEE
 - (1) 144 positive mosquito pools
 - (2) 57 sentinel chickens
 - (3) 9 horses, 1 emu, 1 alpaca, 1 goat
- 7) WV - Anita Ray
 - a) Budget issues
 - b) Limited mosquito work
 - c) No dedicated staff for surveillance or control
 - i) Surveillance done through public health
 - ii) Some done through the university system
 - d) Weather
 - i) Drought in 2008
 - ii) Drought broke late in 2009
 - iii) Mostly cool and dry in 2009
 - e) Arboviral
 - i) WNV
 - (1) Mosquitoes
 - (a) Positive mosquito pool found in early June (*Ae albopictus*)
 - (b) Test May-Sept (130 pools tested positive)
 - (c) Positive pools in 5 counties
 - (2) One WNV+ horse
 - (3) 2 positive birds (test all species)
 - (4) No human cases
 - ii) LAC
 - (1) 10 human cases
 - (2) 5 counties
 - iii) 2 travel-associated malaria cases reported
 - f) Tick-borne
 - i) 3 RMSF
 - ii) A lot of Lyme
 - g) Black flies
 - i) Dept of Agriculture does some black fly control
 - ii) Primarily in area of big rafting industry
 - iii) This program may be cut - will negatively affect tourist industry
- 8) GA - Jeff Heusel
 - a) Weird weather

- i) 2 flooding events
 - (1) Spring - much of south GA
 - (2) Fall - parts of north GA and metro Atlanta
- ii) Huge numbers of nuisance species
- b) WNV
 - i) 4 human cases, 2 fatalities
 - ii) 2 PVBDs
- c) LAC - 2 cases
- d) Dengue - 4 cases
- e) Surveillance
 - i) 25 counties submitted mosquitoes
 - ii) 5 positive counties (24 total pools)
- f) Dead birds - 1 WNV+ crow in metro Atlanta area
- g) Vet Surveillance
 - i) EEE cases more than doubled
 - ii) Has been increasing over the last year or two
 - iii) Cases occurred later in the season
 - iv) 1 case occurred north of the Fall Line
- h) GMCA meeting
 - i) See www.GAmosquito.org for more info
 - ii) 2010 meeting, Oct 20-22 in Athens