2013 GMCA Meeting

Session 1: Wed 16 Oct 13

1. Missed first 6 talks due to unforeseen circumstance
2. Industry Spotlight
    1. Adapco - Trey English
    2. AMVAC - Peter Connelly
    3. AllPro - David Sykes
3. GPS Asset Tracking - Carlos Gonzales
    1. History
        1. GPS was military-only use until Reagan
        2. Accuracy for non-military released by Clinton
    2. Stellar system
        1. Uses
            1. Simple tracking and reporting
            2. All phases of IMM
        2. Completely waterproof
        3. Internal data storage
        4. Download via
            1. Thumb drive
            2. WiFi
        5. Uses Google maps
        6. Satellite view option
        7. Can show spray on/spray off
        8. Calculates flow amount
        9. Reports
            1. Formats
                1. Text file
                2. XLM
                3. KML
                4. Shape files for ESRI
            2. Reported data
                1. Vehicle
                    1. Location
                    2. Speed
                2. Chemical
                    1. Flow rate
                    2. Flow amount
4. Impact of Urbanization on WNV Risk in Atlanta, GA - Krisztian Magori
    1. Disease ecologist view point
    2. Estimation of WNV risk, not prediction
    3. WNV transmission in Atlanta, 2009-2011
        1. Investigate pattern drivers

2. Convergence of environmental and social conditions
3. Washington Park - Bankhead neighborhoods

4. History in Atlanta
    1. First detected in 2001
    2. 92 cases in Fulton and DeKalb counties
    3. Related to CSO pollution
5. Materials and Methods
    1. 58 sites where data were collected consistently
    2. Calculated
        1. *Culex quinquefasciatus* numbers per trap night
        2. MIR at same sites
        3. Vector index (VI)
6. Results
    1. WNV+ mosquito pools are spatially constrained
    2. 3 locations where high VI values are found
    3. Why?
        1. Densely built up
        2. Poor
        3. Piles of trash dumped in area
7. Interdisciplinary project
    1. Hydrology in urbanized areas
        1. Reduced stability
        2. Lots of flow into streams after rainfall events
    2. Land use
        1. Study sites
            1. Forest cover
            2. Impervious cover
            3. Barren land
        2. 2010 Census data - used tracts
            1. Income
            2. Housing age
            3. Education level
            4. Vacant houses
    3. Intensive ground sampling
        1. Forest structure
        2. Socio-economic sampling (containers)
        3. Water sampling
        4. Sociological survey (KAP on mosquitoes and WNV)
        5. Storm water catch basin data - still needed
8. Pattern of risk
    1. Amount of forest cover is related - areas with more forests have less WNV
    2. Income is related - low income neighborhoods have more WNV
    3. Housing age is related - positive (biggest effect)

1. Pre 1960s housing
2. Older neighborhoods have more WNV

9. Conclusions
   1. Land cover change and socioeconomic conditions associated with risk
   2. Increased health hazard
      1. Poverty
      2. Forest loss
      3. Urbanization
   3. These groups also have limited healthcare access

Session 2: Thursday 17 Oct 13 (AM)

5. Is Climate Change Affecting VBD Transmission? - Don Champagne
   1. Why focus on VBDs
      1. Wide spare and prevalent
      2. Range changes have occurred recently
   2. Possible affect
      1. Increased duration
      2. Earlier transmission
      3. Spread
   3. Evidence
      1. Kovats et al, Phil Trans R Soc London B (2001) 356
      2. Detailed historic data are lacking
      3. Many confounders
         1. Land use change
         2. Population change
         3. Abatement activities
         4. Others
   4. Some diseases of interest
      1. Malaria
         1. Several models are generating opposing outcomes
            1. Climate-based
            2. Biology-based
         2. Martens et al 1999 risk map uses climate change parameters and shows an increase in malaria cases by 2080
         3. Rodgers and Randolf, Science 289, 2000, criticized this risk map nod determined the distribution of malaria would stay the same
         4. Epidemics more closely associated with movement of people, not climate
         5. Global picture - net decrease in malaria transmission
         6. Temperature and transmission
            1. Model parameters are almost all affected by temperature
            2. Optimal temperature for transmission is actually lower than predicted
            3. Higher temps may actually reduce transmission efficiency

7. Climate change models assume that climate alone is responsible for malaria spread - not true
    1. Malaria was widespread in the US in 1914
    2. By 1951 it was declared to be eradicated
        1. Population movement
        2. Improved housing and nutrition
        3. Better socioeconomic conditions and living standards led to changes in human behavior
        4. Access to medical services
        5. Mosquito control
2. Chikungunya
    1. Could the jump to Italy reflect a warming European climate?
    2. Or are there other issues?
        1. Spread of *Aedes albopictus* (invasive species)
        2. Specific mutation of the virus to make it more infectious in albos
        3. New variant is more efficient
    3. What about *Ochlerotatus japonicus?*
    4. Availability of competent vectors could lead to spread, not climate change
5. Conclusions
    1. Malaria - evidence for climate change influence is weak
    2. Other epidemic outbreaks probably more driven by vector and human movement
6. West Nile Virus Phylogenetics - Jamie Phillips
    1. WNV evolution in GA, 2001-2011
    2. History
        1. 1999 - virus genetically similar to Israeli virus circulating in 1998
        2. Got to GA in 2001
        3. Spread throughout the US by 2003
        4. Why?
            1. Mutation occurred in NY
            2. Single amino acid change increased viral fitness
    3. Wildlife affect
        1. Very virulent to corvids
        2. This is the result of another amino acid change
    4. What is happening in the rest of the country?
        1. NE - not seeing many genetic changes
        2. Out west - regional variations are being seen
    5. What is happening in GA?
        1. Is the virus being reintroduced?
        2. Is it overwintering?
        3. Is it changing?
        4. Methods
            1. Split GA into north and south
            2. Pulled 10 samples every year

3. Looked at genome - premembrane and envelop areas

5. Results
    1. Very few genetic differences over the 10 year period - changing as expected of an RNA virus
    2. One notable amino acid change
    3. WN02 strain replaced NY99 strain by 2004
    4. Diversity within isolates
        1. Initially, no increase in diversity
        2. Virus became more diverse in 2003-2004
        3. Decline in diversity is now occurring
    5. Gene flow is occurring from all over the US - related to bird migration???
    6. What about Savannah?
        1. They cleared the virus in 2007-2010
        2. 2011 virus isolates were different
        3. This constitutes a reintroduction event
        4. Why was WNV able to reintroduce?
6. Conclusions
    1. Re introductions are occurring
    2. Overwintering is occurring
    3. More work needs to be done

7. The Bridge over the River Kwai: The Man-The Movie - Joe Conlon
    1. Fictional account of a historic event
        1. Book written by Pierre Boulle in 1952
        2. Movie was not true to reality (1957)
    2. What really happened
        1. Japan used railroad to supply operations in Thailand
            1. 300 mile long railroad
            2. 688 bridges
        2. LtCol Philip Toosey
            1. Fought to the last
                1. Was told to surrender by his superiors
                2. Was given the opportunity to evacuate but refused
                3. Respected by Japanese for his refusal to give up - cultural prospective
            2. He and his regiment (650) were sent to Tamarkan to build bridge
            3. Not a collaborator as shown in the movie - was ordered to work by his superiors
            4. Cared about his men both during and after the war
            5. After the war
                1. Toosey was demoted - his men petitioned for him to be promoted
                2. Became a justice of the peace and was strongly involved in government service
                3. Testified on Saito's behalf at his war crimes trial - not convicted
                    1. Respected Saito for not being cruel
                    2. Did not like him

3. Treated him with respect
4. Was knighted in 1974
5. Became president of the Liverpool School of Tropical Medicine and Hygiene
    1. Sent his men there for treatment
    2. Changed to way the school worked
6. Suffered from wet beriberi and pellagra
7. Had nightmares
8. Died in 1975

3. Conditions
    1. Korean prison guards looked down on by the Japanese
    2. Japanese looked down on prisoners for surrendering
    3. Diseases
        1. Cholera
        2. Beriberi
            1. Wet
            2. Dry
        3. Dysentery
        4. Pellagra
        5. Malaria
        6. Tropical ulcer

4. The bridge
    1. Actual bridge was in Tamarkan on the Mac Klong River
        1. Built above the flood plain
        2. By a spring
        3. Workers
            1. 177000 locals and prisoners worked on railroad
            2. 80000 or so died
        4. 12 guards for camp
            1. No fences
            2. Locals hated the British and would turn them in
    2. Toosey's command
        1. Required officers and enlisted to sleep and eat together against common policy at that time
        2. Cleanliness was required in the camp
        3. No beards were allowed
        4. Spit and Polish was required
        5. Approached Japanese for better food
            1. Were getting a cup of polished rice a day
            2. Had to catch whatever they could for meat
        6. Required daily bathing
    3. Boon Pong
        1. Mayor of town by site
        2. Established a clandestine method of supplying food and other supplies

5. Malaria in the war
    1. Decrease from 1942 to 1945
    2. All troops had to deal with malaria
    3. Civilian deaths were far worse
    4. Tamarkan hospital - upwards of 2% died of malaria
6. Major Yoshihiko Futamatsu
    1. In charge of project
    2. Had an engineering degree
    3. Went on to help design the Japanese bullet train
    4. Sergeant Major Teruo Saito was in direct charge of the prisoners
        1. Educated in the US
        2. Hard but fair and could be trusted
7. Building the bridge
    1. The bridge had to be rebuilt 9 times
    2. Sabotage was very difficult
        1. Wooden bridge - prisoners brought termites in with dirt
        2. Steel bridge - mixed concrete poorly
    3. Allies bombed the bridge
        1. Prisoners had to rebuild the bridge
        2. Bombs didn't always go where they were meant to go
        3. First smart bomb used here

3. The movie
    1. Filmed in Ceylon (Sri Lanka)
    2. Locals used for a lot of the parts
    3. Real participants did not like the movie at all
    4. Bridge designed by 2 MIT students
    5. Casting was "interesting"
    6. Lots of cultural issues were ignored
    7. Blowing up the bridge was a big event

8. GA EPD NPDES Permit Update - Dan Abrams
    1. Current permit expires in 2016
    2. 50 requests to apply have been received by EPD so far
    3. Renewal process starts about 18 months before renewal is required
        1. Send email to Dan Abrams to get on renewal list
        2. Will keep everyone updated
    4. Looking for public comment
    5. Issues
        1. Getting the info out
        2. Outline of minimal requirements
        3. Streamline reporting
        4. What is compliance
        5. Are our training/forms/info sufficient
    6. Process

    1. NOI
    2. Maintain records
    3. Write PMP
    4. Report adverse effects
    5. Write a report
9. Industry spotlight
    1. Bayer
    2. Central Life Sciences - Charlie Pate
    3. Clarke - Joe Strickhouser
10. Entobac: A New Bti Pesticide for Larval and Adult Mosquito Control - Tom Kollars
    1. Entobac
        1. Bti will kill adult mosquitoes
        2. As mosquitoes die and fall into the water, the Bti deposited will kill the larvae
        3. Delivery of pellets
            1. Paintball gun
            2. Hand
            3. Artillery
    2. Provector
        1. Bti 6.5% impregnated pad
        2. Mosquito attractant bait
        3. Lasts about 6 months
        4. Kills mosquitoes after a couple of days
        5. Multitude of tests shows a reduction in mosquito populations when used outside or inside
    3. Entobac D adulticide
        1. AI
            1. 6.5% Bti
            2. 0.1% deltamethrin
        2. Applied to Netty bible tract (Medical Missionaries)
            1. Black and red - Anopheles
            2. Black and white - Aedes
            3. Yellow - Culex
            4. Black - flies
        3. Kills mosquitoes and flies
        4. Super Netty lasts 2-3 months (bottle tract)
    4. Future
        1. Register with EPA
        2. Working in 46 countries
        3. Assisting communities with micro business applications
        4. Moving forward

Third Session: Thursday 17 Oct 13 (PM)

11. Urban Ecology of WNV in Atlanta - Gonzalo

1. Background
    1. Incidence of neuro-invasive WNV cases is lower in the SE states
    2. The same was true of SLE
2. Why?
    1. Low mosquito abundance
    2. Absence of transmission hot-spots
    3. Low enzootic transmission
    4. Absence of a competent reservoir host
    5. Complex bird community dilutes transmission
    6. Different viruses
    7. Low human exposure
3. Vector ecology - linking hosts, vectors, and disease
4. The components
    1. Mosquitoes
        1. *Culex quinquefasciatus* is the primary vector
        2. Plenty of urban habitat
    2. Transmission hot spots do occur
        1. CSOs
        2. Clustering of WNV+ mosquitoes and birds, and human cases
        3. Lund et al, submitted
        4. Chemistry change due to overflows enhances vector oviposition
    3. Enzootic transmission
        1. Seropositivity throughout GA
            1. Pigeons
            2. Cardinals
            3. Doves
        2. Looked at land use and habitat
        3. Limited Spillover to Humans from WNV Viremic Birds in Atlanta, 2003, Levine et al, Vector-Borne and Zoonotic Diseases, 13
            1. Collected in Grant Park
            2. Viremic birds
            3. 34% seropositivity
            4. Northern cardinal is a competent reservoir in the south
        4. What other reservoirs are available
            1. Donal Bisanzio
            2. Squirrels collected in Grant Park
            3. 34% seropositive
            4. Work is continuing
    4. Bird-Mosquito Contact Network
        1. Interaction between birds and mosquitoes
        2. Feeding preferences
        3. Bird population composition has more impact on WNV prevalence within bird groups than in the overall population

4. Blood meal ID (Karen Wu, unpublished)
    1. 24% of bird meals come from cardinals
    2. 37% of mammalian meals come from humans
    3. Evidence of human-bird mixed blood meals
5. Questions still needing answers
    1. Virus
    2. Human exposure

5. Conclusions
    1. We should have more human cases
    2. We need to know more about contact rates between humans and mosquitoes and birds and mosquitoes
    3. No one single answer

12. Quantifying *Culex quinquefasciatus* Host Feeding Preferences - JR McMillan
    1. Background
        1. Preferred host is a predictor of virus amplification
        2. Chicago study
            1. Preferred host is preferred based on
                1. Roosting behavior
                2. Nesting
                3. Defensive behaviors
            2. Late season feeding shift was to other avian species, not to mammals
        3. Kilpatrick et al 2006 - robins are an over utilized host for Culex spp
        4. This does not appear to hold true for the Atlanta area
        5. Defensive behaviors
            1. Simpson 2009 - avian host selection study
                1. Robins chosen over other host
                2. Defensive behaviors were not looked at
            2. Bird defensive behaviors by John Edman's group in the 1970s
            3. Recent studies have shown a mix of no influence through lots of influence
    2. Study
        1. Materials and methods
            1. Collected mosquito eggs from field
            2. Collected birds
            3. Put 2 birds and 30 mosquitoes in cage overnight
            4. Recorded defensive behavior for first hour
            5. Collected blood fed mosquitoes
            6. Did molecular analysis
            7. Tests
                1. Overall blood feeding
                2. Proportion feeding on cardinals
                3. Defensive behavior
        2. Results
            1. Not all the mosquitoes fed - overall blood feeding

        1. Seemed to be random
        2. Thrashers reduced the number of mosquitoes feeding
    2. Blood meal source
        1. Mosquitoes fed less on cardinals than on robins and blue jays
        2. No difference between cardinals, thrashers, and catbirds
    3. Defensive behaviors
        1. Birds protected their feet and heads the most
        2. Not a lot of data to date
        3. Defensive ratio
            1. No pattern seen
            2. Robins appear to more defensive than blue jays
3. Conclusions
    1. There is a potential preference for robins and blue jays vs cardinals
    2. Defensive behaviors vary
    3. Doesn't appear to be a relationship between blood feeding success and defensive behavior
    4. Did not find a preference for cardinals
    5. Needs more work

13. Martin County Mosquito Control Response to a Dengue Outbreak - Gene Lemire
    1. Martin County
        1. 239 square miles
        2. Coastal
        3. Just north of Miami-Dade
    2. Questions
        1. How did dengue get from the FL Keys up to Martin County?
        2. Why are *Aedes albopictus* now being superseded by *Aedes aegypti* after they had disappeared?
    3. Dealing with dengue - 2013 outbreak
        1. Occurred in 2 communities
            1. Rio - 356 acres
            2. Jensen Beach - 151 acres
        2. Why are they different
            1. Rio
                1. Old Florida neighborhood
                    1. Old homes
                    2. Houses sit up off the ground
                2. People sit and work outside day and night
                3. People are use to mosquitoes
                4. Lots of old growth and bromeliads and containers
                5. Lots of low income residents
            2. Downtown Jensen
                1. Open air restaurants
                2. Older part of town

    3. Lots of rental properties
    4. Lots of containers
    5. Heavy vegetation around businesses
3. Control
    1. Ground ULV truck adulticiding
    2. Aerial adulticiding (Dibrom)
    3. House to house inspection sweeps (7 weeks)
        1. Larvicide (altosid granules) or dump containers
        2. Educate homeowners
        3. Adulticide with backpack sprayer
        4. Thermofogger used under houses and in wooded areas
        5. Kubota mister with altosid liquid for hard to reach areas
    4. Chemicals
        1. Dibrom
        2. Permanone 3030
        3. Wisdom
        4. Altosid XRG
        5. Four Star 180 day briquettes
    5. Surveillance
        1. Ovitraps
        2. Mosquito magnets
    6. Research
        1. Program only have 7 employees
        2. Lots of opportunity
    7. Problems
        1. Lack of access to properties
        2. Traps being stolen
        3. Lack of info from health department
        4. People just not listening to the message or take it seriously
        5. Other problems interfered with the message importance
        6. People turned containers back over
        7. *Aedes aegypti* are hard to kill
4. Messages
    1. Media
    2. Reverse 911
    3. Door to door surveys
    4. Brochures
5. Fear works!
    1. Workers also need to be following the message
    2. Just repeating the same thing over and over won't work
    3. It took time to get people to listen - usually about 3 weeks
    4. Sweep data
        1. First sweep - 30% properties had mosquitoes

2. Second sweep - 14% did
3. 3rd sweep - 0

14. Industry spotlight
    1. Univar - Jason Conrad
        1. MosquitoTrac - an app for mosquito control
        2. Federal NPDES permit was used as a template
        3. Currently written for iPhone, iPod, and iPad
    2. Valent BioSciences - Candace Royals
15. Microhabitat Preferences of Larval Mosquitoes - Nathalie Smith
    1. Study site
        1. Ichauway Ecological Reserve
        2. 29000 acres of long leaf pine forest
        3. Minimally disturbed isolated wetlands
            1. Not connected to surface water
            2. Variable periods of flooding and drying
            3. Small
            4. Role in landscape is poorly known
            5. Lack of legal protection
            6. Frequently disturbed by land use changes
            7. Important in contributing to regional biodiversity
                1. Plants 300-400 species
                2. Amphibians - 40+ species
                3. Invertebrates - many species
    2. Area is impacted by agriculture
    3. Comparing mosquito populations on the reserve and in the agricultural areas
        1. History
            1. 34 species
            2. Fewer species in agricultural areas
    4. Reference wetlands
        1. Grass-sedge marsh
        2. Cypress-gum swamps
    5. Current study
        1. Microhabitats
            1. Edge
            2. Vegetation gaps
            3. Continuous vegetation coverage
                1. *Panicum* spp
                2. *Carex* spp
            4. Cypress
            5. Depth of water
        2. Methods
            1. 36 individual capture chambers
            2. 1 meter square grid

3. 3 samples - Feb, May, Sept
4. Raised larvae to 4th instar
5. ID to species

3. Results

1. Analyzed data based on proximity to edge
2. High abundance of larvae at edge
3. Drop off then gradual rebuild towards open water
4. Vegetation extremely important for finding larvae
5. Species differences seen
6. Depth

1. *Anopheles quadrimaculatus* seen in shallow depth

2. All others were found in intermediate depth

4. These data may help in improving sampling techniques

6. Additional work is being done

16. Phenology of a Relict Population of Pitcher Plant Mosquitoes in Tattnall County - Rachel Morreale

1. Mosquito
   1. *Wyeomyia smithii*
   2. Found in pitcher plant *Sarracenia purpurea*
   3. Rare in Georgia
   4. Commensalism - nutrient processing chain
2. Populations by latitude
   1. Northern
      1. Obligatory autogeny
      2. Univoltine
      3. Winter larval diapause

   2. Southern
      1. Facultative autogeny
      2. Multivoltine
      3. Summer and winter diapause
3. Site locations
   1. Tattnall County - geological seep
   2. Florida
   3. North Carolina
4. Previous studies done from 1997-2000
   1. Behavior
   2. Reproduction
   3. Genetics
   4. Biochemistry
5. Results
   1. Blood feeding
      1. Florida, yes
      2. Others, no or not really

2. Number of emergencies per year
    1. FL multiple
    2. GA and NC, one
3. Genetics
    1. GA and FL closely related
    2. NC is not quite as related
4. NC expresses hexamerin strongly

6. Conclusion - GA populations is an intermediate between the FL and NC populations
7. Changes in 2004-2011
    1. GA populations began to blood feed more and more frequently
    2. Earlier, only one female tried to blood feed
    3. Current work
        1. Bionomic analysis
            1. Weekly survey
            2. 6 plants - 6 rosettes
            3. Allow blood feeding
        2. Results
            1. Can see population fluctuations with season
            2. Correlation of number of larvae to volume of liquid in pitcher plant
            3. Blood feeding occurred later in the year initially
            4. Larval distribution differs by rosette
        3. Why?
            1. Changes in climate
                1. Less rain
                2. Higher temps
            2. Stresses to plants and mosquito
8. Conclusions
    1. Population genetics study show high levels of inbreeding
    2. Larval distributions differ by plants
    3. Blood feeding is increasing
    4. This species is at risk in Georgia

17. Ethics - Jim Leedy
    1. Definition - rules of behavior based on ideas about what is morally good and bad
    2. Perception vs reality
        1. What about my organization? How is it perceived?
        2. Always room for improvement
    3. Why is non-ethical behavior accepted
        1. Fear of losing job
        2. Thinking nothing will be done about it anyway
        3. Lack of power
    4. How can this be changed?
        1. Leaders need to be approachable
        2. Need to listen

3. Leaders must have high standards themselves
4. Educate others
5. Be transparent
6. Be considerate
7. Be consistent
8. Remember to give your team credit for the good work that is done

Session 4: Friday 18 Oct 13

18. The Validity of Common Morphological Markers Used to Identify *Culex* spp - Brian Byrd
    1. Background
        1. *Culex pipiens*/*quinquefasciatus* and *Culex restuans*
        2. Involved in enzootic transmission of WNV
        3. Difficult to differentiate morphologically (Harrington and Poulson 2008)
        4. Molecular ID by PCR more accurate but more labor intensive and expensive
    2. Characteristics for ID
        1. 3 morphological characteristics
            1. Pale spots on scutum
            2. Shape of banding on abdomen
            3. Color of erect head scales
        2. Keys to the Mosquitoes of the Mid-Atlantic Region, Harrison et al (unpublished)
    3. Materials and Methods
        1. Collected specimens from gravid traps in PA, NC, and VA
        2. ID'ed by the three characters
        3. Used PCR to determine accuracy
    4. Results
        1. 2 pale scales
            1. Sensitivity 46%, Specificity 100%
            2. Good for pipiens but not for restuans
        2. Abdominal bands
            1. Sensitivity 90%, specificity 63%
            2. Works well for pipiens but not for restuans
        3. Head scale color
            1. Sensitivity 96%, specificity 95%
            2. Works well for both species
    5. How available are these characteristics
        1. Head scales - missing 40% of time
        2. Scutal scales - rubbed 16% of time
        3. Abdomen rubbed 11% of time
    6. Conclusion
        1. The head character is a good character for ID
        2. The presence of actual spots is a good diagnostic character but the absence is not
        3. Abdominal band character is a good predictor for pipiens
    7. Using the data

    1. Look for white spots - if they are there, it is *Cx restuans*
    2. Look at head scales - if you can ID here, stop
    3. Look at abdomen
8. Additional work is planned

19. Ticks: Blood-Suckers and Disease Transmitters - Nancy Hinkle
    1. Ticks re inject liquid portion of blood back into host
    2. Tick hosts include just about every vertebrate species in the area
    3. Methods
        1. Tick drag
            1. 300 meters per month
            2. 1 hour before sunset
        2. ID ticks in lab
        3. Sampled in a transition zone in Clarke County
            1. Upland hardwood forest
            2. Creek
            3. Old pasture
    4. Species
        1. Lone star tick
            1. Very common (59%)
            2. Primarily spring and fall
        2. Gulf coast tick (3%)
            1. Not common
            2. Spring and fall
        3. Deer tick (1%)
            1. Uncommon
            2. Winter
        4. American dog tick (37%)
            1. Common
            2. Summer, spring, early fall
    5. TBDs
        1. RMSF is common
        2. Ehrlichiosis and anaplasmosis rare
        3. Lyme rare
    6. Meat associated tick allergy
        1. Med J Aust 190: 510-511
        2. Something in lone star tick saliva predisposes some people to allergic reactions to red meat
            1. Alpha-gal
            2. Occurs later in life
        3. Odd allergy
            1. Delayed hypersensitivity
            2. Develops later in life
            3. Sugar, not protein

4. May be blood type dependent
5. Hives to anaphylaxis

20. Some Thoughts on Leadership - Stan Cope
    1. Just an aside, a good resource - afpmb.org
    2. Leadership is an interpersonal influence directed toward a goal or goals
    3. Leadership can go in many directions, have many different styles, and has many different faces
    4. Great leaders
        1. Mother Theresa
        2. Vince Lombardi
        3. Nelson Mandela
        4. George Patton
        5. Clara Barton
        6. Gandhi
    5. What makes a leader
        1. Dynamic relationship
        2. Mutual influence
        3. Common purpose
        4. Collaboration
        5. Highly motivated
        6. Effect real, intended change*
    6. Leadership vs Management
        1. Leadership is primarily an external function
            1. Implement change
            2. Inspiration - how you feel
            3. Motivate - what you do
            4. Have influence
        2. Management is primarily an internal function
        3. These can be the same person, but often are not
        4. People willingly follow leaders because they want to, not because they have to
    7. Successful Leadership
        1. Everything can be improved upon
            1. Doesn't mean things are broken
            2. Just a good mindset to have
        2. Fix problems, not blame
            1. Have reasons, not excuses
            2. FIX things
        3. Mistake - timely corrective action - move ahead
        4. Respect and follow the chain of command - try to resolve things at the lowest level
        5. Value diversity in ideas, people, and methods
        6. Strive to do the right thing even when no one is looking
        7. Never stop learning - don't skimp on training
        8. Be a conscientious steward of resources

9. Expectations go both ways
    1. Your employee should not be surprised by what you tell them
    2. Ask what the employee expects from you
10. Don't tell people how to do the job, tell them what needs to be done
11. Expect mistakes, but expect people to learn from their mistakes
12. Take responsibility and give credit
13. Correct bad decisions
14. Don't get into rut
15. Recognize accomplishments, look for reasons to recognize people
16. Get out, walk around, listen
17. Encourage innovation
18. Be decisive

8. Things not to say
    1. We have always done it that way
    2. This is guaranteed to make you irrelevant
9. Things to do
    1. Have a good simple mission statement - what you do
    2. Have a vision statement that provides values and guidance - what we are
    3. Strategic planning should be long term but flexible, reasonable, AND measurable
        1. Goals
        2. Objectives
        3. Tasks
        4. Timelines

21. The Untold Story of Sir Ronald Ross - Stan Cope
    1. The history
        1. Ronald Ross is credited with the first successful mosquito transmission of malaria
        2. Received a Nobel Prize in 1902
    2. Background
        1. Born in 1857
        2. Oldest of 10 children, 9 who lived
        3. Born in India
        4. 1865 - sent to England for schooling
        5. Enrolled in medical school in 1874 but failed to qualify
        6. Became a ship's surgeon in 1880
        7. Joined Indian Medical Service
        8. Married in 1889 - 4 children
    3. Who was the man?
        1. Interested in many subjects
            1. Finally focused on sanitation
            2. Took a class in bacteriology
            3. Self-taught in microscopy
            4. Began to study mosquitoes in 1889
        2. Poet and romantic

3. Suffered from depression
4. Abrasive personality

4. The mosquito years
    1. Very ignorant of the literature
    2. Criticized Laveran's theory
    3. Thought malaria had an intestinal etiology
    4. Met Patrick Manson
        1. Manson educated Ross
        2. Kept Ross focused
        3. Changed his ideas about Laveran's theory
        4. Manson had a theory on mosquito transmission of malaria
    5. Accomplishments
        1. Proved that malaria could not be transmitted by drinking water contaminated by mosquito larvae and infected mosquitoes - Manson's theory
        2. Studied human malaria parasites in mosquitoes
        3. Credited the "dapple wing" mosquito as the culprit
        4. Mosquito Day - August 20, 1897
        5. Experimented with avian cycle of malaria
        6. Experimental career ended in 1899 when he retired from the military service
5. Issues
    1. Rift between Ross and Giovanni Battista Grassi
        1. The Italians knew what Ross had done
        2. Knew what tasks remained
            1. Human - malaria cycle
            2. ID vector
        3. Did not give adequate credit to Ross
        4. Ross' data were not all published as of yet
    2. Ross remained angry about this for the rest of his life
6. The rest of the story
    1. Knighted in 1911
    2. Taught at Liverpool School of Public Health
    3. Advocate of public health
    4. Maintained his interest in malaria
7. Remembering Ronald Ross
    1. Renaissance man
    2. Applied scientist
    3. Difficult and abrasive
    4. Held a grudge
    5. Poet, mathematician, writer
        1. Wrote 3 novels
        2. Literary works
        3. Numerous poems

22. Morphological Considerations, *Aedes triseriatus* and *Ae hendersoni* - Mike Riles

1. Some background
    1. Focus of WCU Vector-Borne Infectious Disease Lab
        1. LAC-endemic area
        2. Study virus and vectors
            1. Under reported
            2. For every one infection, 150-300 are missed
            3. Disease of children <15 yo
    2. The vector - *Aedes triseriatus*
        1. Sibling species
            1. *Aedes hendersoni*
            2. Mostly incompetent for LAC transmission
        2. Two species will hybridize
    3. Surveillance
        1. Ground level oviposition cups
        2. Get several species
            1. *Aedes japonicus* 20%
            2. *Toxorhynchites rutilus*
            3. *Aedes albopictus* 43%
            4. *Aedes hendersoni* 13%
            5. *Aedes triseriatus* 24%
    4. Pilot study
        1. Where are the two siblings species found
        2. Species thought to be canopy species were being found at the ground level
    5. 2012 Study
        1. Looked a 3 different sites
            1. Elevation difference
            2. Tree age difference
        2. Used 2 oviposition heights
            1. Ground level
            2. 9 meters
        3. Collected 11,394 eggs
            1. Collected June - Sept
            2. Issues with hatching
            3. Egg numbers dropped after June
        4. Analysis
            1. Looked at native vs invasive
            2. Looked at vertical distribution
                1. Found oviposition where the literature says there should be none
                2. Appears to be site-specific differences
    6. So, where is *Aedes hendersoni*?
        1. Overall, 33% of hendersoni were collected at ground level
        2. Important, because this is a non-vector
2. Identifying species (larvae)

1. The process
    1. Characters from Darsie and Ward are difficult to use
    2. Lunt et al 1977 described some secondary characteristics
    3. Looked at 2 potential novel characteristics
2. Looked at 14 character states
    1. Some are easier to see than others
    2. Most did not hold true as distinct between species
    3. Ones that worked
        1. Setae 1-X, number and length compared to saddle
            1. Consistent with Lunt
            2. All unknowns had 4 or more branches
            3. Saddle ratio <1 for unknowns
        2. Setae 4-X, number and branching
        3. Setae 1-S, branching (not definitive)
3. Novel species specific PCR
    1. Reno and Novak 2000
        1. More complicated
        2. Time consuming
    2. New assay
        1. Hours vs days
        2. Fewer steps
        3. Easier to interpret
        4. Less expensive
        5. Less opportunity for error
        6. Potential for differentiating hybrids
            1. 141 base pair difference between the two species
            2. Bands separate nicely when run separately or together
    3. What were the unknowns?
        1. Most were triseriatus
        2. Secondary characteristics worked for ID
        3. Work is ongoing

3. Future research
    1. How do the other species affect LAC transmission
    2. *Aedes japonicus* oviposition is mostly at ground level - more work needed
    3. PCR work will continue

Business Session

23. Officers for 2014
    1. President - Ian Brown
    2. VP - Alan Gaines
    3. ST - Jerry DeRamus and David Touwsma
    4. Directors
        1. 1 year - Jeff Heusel

2. 2 year - Kenna Graham
3. 3 year - Joey Bland

5. Industry member - Julie Fogg
6. Cooperative Extension - Elmer Gray
7. Public Health - Rosmarie Kelly

24. Other business
    1. AMCA 2016
    2. MAMCA - 2015

Paper of interest: Mosquito Abatement in a Changing World - Horsfall (http://ia600602.us.archive.org/5/items/cbarchive_102209_mosquitoabatementinachangingwo1985/JAMCA_V01_N2_P135-138.pdf)