The Newsletter of the Florida Mosquito Control Association **Volume 5, Issue Number 2**
Mar/April 2005

2005 FMCA Spring Meeting
May 3 – 4, 2005, Naples, Florida
Details inside this issue of *Buzz Words*
Please note time change for Board of Directors Meeting – new scheduled start time is 8:30 a.m.

SOVE 4th International Congress
Oct. 2-7, 2005, Reno, Nevada
http://www.sove.org/4th%20Congress/CONGRESS.html

FMCA New Mailing Address, Phone, and Fax

Kellie Etherson
Florida Mosquito Control Association
Post Office Box 358630
Gainesville, FL 32635-8630
Phone: 352-281-3020; Fax: 352-334-2286
email: ethersonk@cityofgainesville.org

Deadline for submissions to be included in the May/June 2005 issue of *Buzz Words* is May 31, 2005. Please send articles and change of address information to:
Dr. Roxanne Rutledge, Editor
FMEL
200 9th Street S.E.
Vero Beach, FL 32962
or buzzwords@ifas.ufl.edu

AMCA NEWS

From the Editors of *Wing Beats*

Wing Beats is looking for interesting field-related or technical articles about mosquitoes, mosquito control, and related topics. The articles are usually 1 – 4 pages in length (including graphics and figures). A considerable amount of applied research, equipment modifications, and application technique changes being conducted at mosquito control programs, universities, and military installations throughout the world would be of interest to the Wing Beats audience. We encourage you to consider publishing in Wing Beats. Please send articles to: Marin Brouillard, Editor-in-Chief, Collier Mosquito Control District, 600 North Road, Naples, FL 34104 or Marin@collier-mosquito.org

Hillsborough County Florida

Mosquito and Aquatic Weed Control Manager

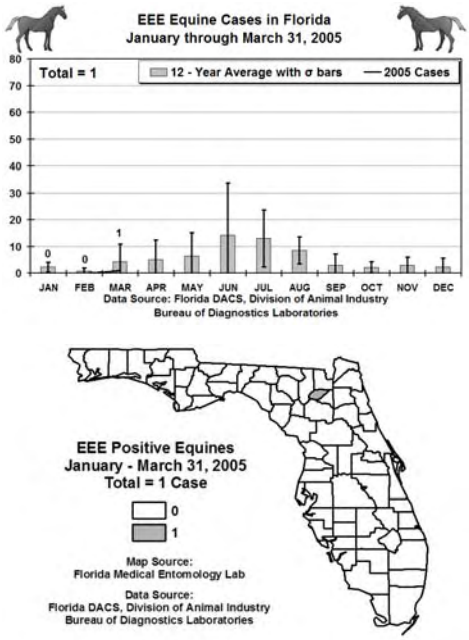
The Public Works Department is seeking a qualified professional to serve as Mosquito and Aquatic Weed Control Manager. Position has responsibility for administrative and supervisory work directing the personnel and operations of the mosquito and aquatic weed control program within Hillsborough County; technical and professional entomological work overseeing a mosquito control surveillance system program, including larvae, adult mosquitoes, and vector-bourne viruses. Directs mosquito & aquatic weed control staff in performing biological and source reduction mosquito and aquatic weed control work and integrated pest control programs. Position oversees the preparation and submission of state applications for financial assistance of mosquito and aquatic weed control projects; preparation of the operational and grant program budgets; also develops, implements and maintains a computer database management system for program activities. Position serves as Hillsborough County's State certified Mosquito Control director under Florida Chapter 388 5E-13.032 Program Directors, Employment and Classification.

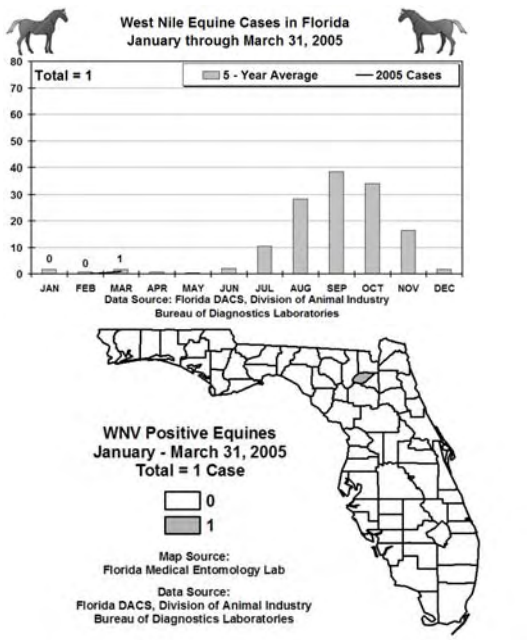
Minimum Requirements: Graduate of an accredited four (4) year college or university with a degree in basic sciences or engineering with course work in entomology, limnology, biology, chemistry or related courses and have a minimum of five (5) years of supervisory/administrative management experience which includes two (2) years of mosquito control experience. Must possess a current Florida Department of Agriculture and Consumer Services (FDACS) Restricted Pesticide License in the Public Health Pest Control category. Must have a valid Florida's driver's license.

Special Requirements: Must possess or be able to obtain a current Florida Department of Agriculture and Consumer Services (FDACS) Mosquito Control Direct III certification within six (6) months of employment in accordance with Chapter 5E-13.032 (5) Florida Administrative Code.

To apply: Qualified applicants send resume, including copies of applicable licenses to: Human Resources, Executive Recruitment, PO Box 1110, Tampa 33601, email dahmad@hillsboroughcounty.org or Fax (813) 276-2197. Position opened until filled.

AA/EOE/Drug free Workplace
www.hillsboroughcounty.org





FMEL NEWS

Mosquito Control Guidelines For Responding To West Nile

A document entitled "Florida Mosquito Control Arbovirus Response Plan – West Nile. Guidelines for Mosquito Control Responses" by Walter J. Tabachnick, Florida Medical Entomology Laboratory, University of Florida - IFAS is now available on the FMEL Home Page at http://fmel.ifas.ufl.edu/index.htm

This plan contains recommended guidelines to assist Florida mosquito control agencies in assessing their West Nile status based on available surveillance information with suggestions for appropriate mosquito control responses commensurate with the risk of West Nile to the population.

$1.9 million Research on Dengue Transmitting Mosquitoes Goes to University of Florida's Medical Entomology Laboratory.

By: Michelle Verkooy (321) 795-3709
Source: Dr. Phil Lounibos

Vero Beach, Fla. ---Understanding the role *Aedes albopictus* has in transmitting dengue (an occasionally fatal flu-like illness) will be one of the areas of research as part of a $1.9 million five year grant awarded by the U.S. National Institutes of Health (NIH) to the University of Florida's Institute of Food and Agricultural Sciences, Florida Medical Entomology Laboratory. The grant will allow Dr. Phil Lounibos to lead studies of the causes and consequences of the invasion of the mosquito species *Aedes albopictus* in the Americas.

For the past five years Dr. Lounibos and his team have been setting the groundwork for this major research effort using previous NIH funding. The new project studies predation and competition in immature mosquitoes and the resulting effects on the distribution and abundance of adult mosquitoes. In addition the project focuses on the relationships between *Aedes albopictus* and the environment, and also on understanding the role *Aedes albopictus* plays as a transmitter of dengue virus here in the Americas. The results of this project have received international recognition as a model for scientists studying other invasive disease-carrying species.

"The importance of *Aedes albopictus* is not yet fully understood, however, it is of great significance to public health because of its potential to transmit dengue in the Americas", said Dr. Lounibos.

Dengue is a mosquito-borne infection that is transmitted to humans by two kinds of mosquitoes, *Aedes aegypti* and *Aedes albopictus*. Dengue is found in the tropical and sub-tropical regions around the world and is a severe flu-like illness that affects all age groups. There are four different serotypes of dengue, and this is one of the reasons that finding a vaccine for dengue has been so difficult.

Aedes albopictus is not native to the Americas but was introduced into the United States in the 1980s as eggs carried in used tires being traded between Asia and the Americas. Although *Aedes aegypti* is the main transmitter of dengue to humans, *Aedes albopictus* has been the main transmitter on islands, including Hawaii, and in tropical Asia.

Historically dengue was quite common in the United States; however, it is less prevalent now. Nevertheless, it has the potential to reinvade areas of the United States, especially south Florida, Louisiana, and Texas, where it once responsible for massive epidemics infecting thousands of people. Human cases of dengue on the Mexico-Texas border have been reported recently, and over 100 persons were stricken with dengue in Hawaii in 2001.

"Research on invasive mosquitoes is especially important because when they invade new areas these mosquitoes may have serious consequences for human health", said Dr. Lounibos.

Florida Mosquito Control Association, Inc.

(Federal ID# 59-1819301)
2005 SPRING CONFERENCE, May 3 – 4, 2005
The Hilton Naples & Towers Hotel
Naples, Florida

The 2005 Spring Conference will start at **8:30 a.m.*** on Tuesday, May 3, 2005 with the FMCA Board of Director's Meeting. The general program will begin at 1:00 p.m. on May 3, and conclude at 12:00 p.m. on Wednesday, May 4. The conference will be held in Collier County, Naples, FL, at The Hilton Naples & Towers Hotel.

Registration must be faxed or mailed by April 15, 2005, for advanced registration fees. There will be no refunds given after April 27, 2005. If you have any questions, please call Kellie Etherson at 352.281.3020 or email her at ethersonk@cityofgainesville.org

Name:_____

Phone:_____

Agency:_____

Address:_____

_____

Fax:_____

E-mail:_____

Advance Registration			***On-Site Registration***	
Member	$75	_____	$80	_____
Non-Member	$90	_____	$95	_____
Student	$25	_____		
Companion	$25	_____	Companion's Name	_____

PLEASE NOTE THAT THE FMCA HAS A NEW MAILING ADDRESS, FAX, AND PHONE. NEW CONTACT INFORMATION IS PROVIDED HERE:

Please fax this form to 352.334.2286 or mail to: Florida Mosquito Control Association Post Office Box 358630, Gainesville, Florida 32635-8630

***This is a change from the last mailing – the BOD will meet at 8:30 am, NOT 10:00.**

FMCA Spring Conference Presentations Schedule:
Hilton Naples Conference & Resort
May 3rd – 4th, 2005
Moderator: Bill Reynolds

Tuesday May 3, 2005

1:00 p.m. Opening Comments, Dr. Walter Tabachnick, Director, FMEL
1:05 p.m. Johnny Hunter, Director, Charlotte County Mosquito Control
1:15 p.m. Bob Betts, Director, Escambia County Mosquito Control
1:25 p.m. Jim David, Director, St. Lucie County Mosquito Control
1:35 p.m. Taryn Crepeau, Director, Polk County Mosquito Control
1:45 p.m. Dr. Nolan Newton, Division Manager, North Carolina Department of Health
2:15 p.m. Steve Dwinell, Director
Jennifer Simpson, Division Entomologist
Florida Department of Agriculture & Consumer Services
3:00 p.m. BREAK

* **Speakers…please allow 2-3 minutes within the 10 minute presentation time slot for questions & answers.**

3:15 p.m. Review, organization and instruction of breakout sessions

A. Impediments
B. Priority Setting
C. Coordination with other agencies
D. Responses

3:25-4:45 Each group Address the following:

A. Impediments
1. What are 6 impediments to mosquito control effectiveness during a hurricane emergency?
2. How can mosquito control overcome the identified impediments?

B. Priority Setting
1. What are the 4-6 primary priorities for mosquito control during a hurricane emergency?
2. What measures are needed to achieve each priority?

4:45– 5:15 Each group reports back to general session

Wednesday May 4, 2005

8:30 a.m. Review, organization and instruction of breakout sessions
8:35 a.m. – 10:30 a.m. Breakout session convene

Each Session addresses the following:

C. Coordination with other agencies
1. What are the 6 primary agencies which mosquito control must coordinate efforts? What is the role of each agency in supporting mosquito control?
2. What is the optimal expectation of mosquito control from each agency? What is the optimal expectation that each agency has for mosquito control?
3. What are the impediments to coordination and support with each agency? What measures can be put in place to overcome impediments to coordination?

D. Responses
1. What mosquito control responses are available using local resources?
2. What are 4-6 mosquito control responses using external resources?
3. What methods are available obtain external resources?

10:30 a.m. BREAK

10:45 – 12:00 Each breakout group provides report to general session

Florida West Nile Surveillance: Estimating mosquito transmission frequencies

In several previous *Buzzwords* columns we have discussed the importance of collecting information about the frequency of mosquitoes in an area that are actually transmitting West Nile virus (WN). All surveillance tools, whether dead bird reports, mosquito infection rates, wild bird sero-surveys or sentinel chicken surveillance are estimates of this one important parameter. A mosquito transmission frequency of 1/1,000 (one mosquito transmitting WN for every 1,000 taking a blood meal) is a 10 fold greater risk than rates of 1/10,000.

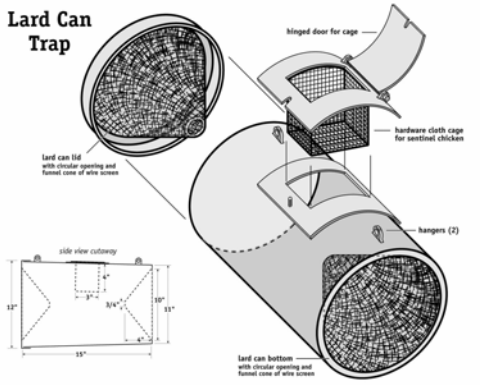
In previous columns we discussed how one can use sentinel chicken surveillance information to obtain crude estimates of mosquito transmission and then use this information to estimate the actual risk for local human cases of WN. Once one has an estimate of the mosquito transmission frequency, human risk follows purely from the numbers of biting mosquitoes averaged per human and the size of the at-risk population.

Mosquito control operations and responses to impending WN epidemics will depend on having critical information for making the appropriate decisions. Mosquito control districts must prepare now to be ready to obtain needed information, particularly in areas where their routine surveillance methods indicate WN transmission. Previously we have discussed the need to discriminate areas where mosquito transmission jumps from 1/10,000 to extremely high frequencies of 1/1000 or higher. This information can be readily obtained by placing Arbovirus Rapid Deployment System (ARDS) traps in select locations.

A description of the ARDS traps and methods can be found elsewhere (Rutledge, CR, et al. 2003. West Nile virus infection rates in *Cx. nigripalpus* do not reflect transmission rates in Florida. *J. Med. Entomol.* 40: 253-258). The figure below shows the ARDS trap, or lard can trap, containing a single exposed sentinel chicken. The trap is capable of collecting all of the mosquitoes biting that chicken during the exposure period.

We advise that each mosquito control district have 5-10 such traps constructed and ready for use during the present Florida WN transmission season. If there is suspicion of significant WN transmission in an area of your district, then it would be advisable to place a trap or two in these locations for one or two evenings. Monitor the numbers and species of mosquitoes biting the birds, observe seroconversions or viremia in the birds, and obtain the mosquito transmission frequency. Place traps out on different nights and in different locations. We guarantee that there will be a time when you will need to know the mosquito transmission frequency with some assurance.

We have to prepare now for the 2005 Florida WN season. It is prudent to have the ARDS traps ready and to have plans in hand for using them to obtain essential information for mosquito control operational decisions to protect the public health and well being.



Walter J. Tabachnick, Director
Jonathan Day, Professor
C. Roxanne Rutledge, Assistant Professor
Florida Medical Entomology Laboratory
University of Florida - IFAS

AVIAN AMPLIFICATION OF ARBOVIRUSES: The key to epidemic transmission.

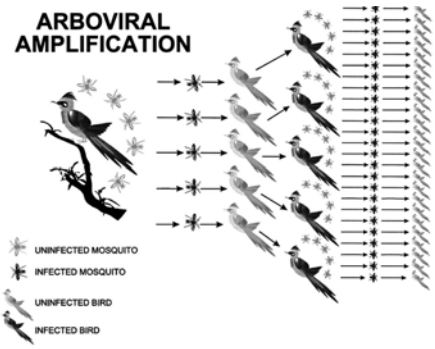
Fortunately, human arboviral epidemics are relatively rare. This is because the conditions conducive for the production of large numbers of infected vector mosquitoes are themselves rare. In Florida, the arboviral transmission season is divided into 4 equal parts (Table 1) (see, Day and Curtis, 1999, Blood feeding and oviposition by *Culex nigripalpus* (Diptera: Culicidae) before, during, and after a widespread St. Louis encephalitis virus epidemic in Florida, *Journal of Medical Entomology*, 36:176-181 for a complete review). The Maintenance Phase (January - March is when arboviruses survive the winter in north Florida and the dry season in south Florida. It is difficult to document virus transmission or isolate virus during the Maintenance Phase. The Amplification Phase (April – June) corresponds with a major portion of the avian nesting season in Florida. During this period mosquitoes and non-immune nestling birds come into contact and initiate the first rounds of avian and mosquito infections. This is called “arboviral amplification.”

The Early Epidemic Phase (July – September), is the hot, wet, humid period that includes the worst of the Atlantic hurricane season. During this phase arboviral transmission increases dramatically, human cases appear, and arboviral transmission to humans rapidly increases with epidemics usually peaking in late September. Finally, during the Late Epidemic Phase (October – December) the number of new human cases gradually declines as epidemics burn themselves out. During many years, few if any human cases are reported. Of the four phases, the Amplification Phase is the most important in determining the relative risk of human infection and the intensity of an arboviral epidemic later in the year.

Full-blown arboviral epidemics require large numbers of infected mosquitoes. St. Louis encephalitis epidemics in Florida have typically reported mosquito infection rates ranging from 1:1,000 to 1:200. To realize mosquito infection rates of this magnitude, extremely efficient viral amplification must occur between local avian populations and vector mosquitoes. As noted above, the Amplification Phase in Florida corresponds with the avian nesting season. This is particularly important because nestling birds provide a relatively easy source of blood for infected mosquitoes and also provide a large population of non-immune birds that can efficiently amplify virus.

Table 1. Temporal dynamics of arboviral transmission in Florida

- JAN – MAR = Maintenance Phase
- APR – JUN = Amplification Phase
- JUL – SEP = Early Transmission
- OCT – DEC = Late Transmission



Epidemic arboviral amplification requires more than just an unusually productive avian nesting season. Large numbers of adult birds also need to be non-immune. Once a bird is infected with an arbovirus and survives, that bird is immune to re-infection for life. If, for example, 75% of the birds in a population have been infected with an arbovirus and are immune, then 3 out of 4 mosquito blood meals are wasted relative to arboviral amplification. Infective mosquitoes feeding on immune birds do not re-infect that bird. Likewise, uninfected mosquitoes feeding on previously infected immune birds do not become infected. In order to have efficient amplification, a large population of non-immune birds must encounter infective vectors. When this happens in the presence of increasing vector populations, explosive amplification as depicted in the cartoon below will occur.

The most important factors contributing to explosive arboviral amplification are: 1) an extensive source of non-immune wild birds and 2) a steady supply of infective vector mosquitoes. There are 3 major sources of birds in Florida. 1) Exotics birds that are imported into the state and include pets, zoo animals, breeding animals in colonies, and birds used as agricultural commodities. 2) Wild migrants that pass through or take up temporary residence in Florida during autumn and spring migrations to and from wintering grounds in the Caribbean and Central and South America. 3) Resident birds that remain in the state throughout the year.

Exotic birds probably play only a minor role in arboviral amplification, mainly because they are so focal and patchy in their distribution. For example, flamingos and parrots are maintained in large numbers in zoos, breeding farms, and theme parks. These populations have very patchy distributions. Exotics such as emus and ostriches are occasionally imported for use in the agricultural industry and may be present in large numbers at very focal locations. Although exotic birds may cause a focal outbreak of arboviral transmission, they are not likely responsible for the amplification necessary to cause a large human epidemic simply because of their patchy geographical distribution.

Huge numbers of migrant birds pass through, or overwinter, in Florida. Obligate insectivores, such as swifts and swallows, pass through Florida during southward migrations starting in August. Other migrant species follow, with the peak autumn migration occurring in Florida between September and October. This places large numbers of migrant birds in Florida during the Early and Late Transmission phases of the Florida arboviral transmission cycle. The non-immune portions of these migrant populations thus have the potential of adding to epidemic amplification in Florida. During spring migration birds move through Florida heading north between February and May with peak activity in March and April. This places spring migrants in the state during the Florida dry season, when mosquitoes are relatively rare. It is unlikely that the spring migrants contribute significantly to arboviral amplification that will result in epidemic transmission later in July - September.

Resident avian populations are therefore the most likely source for the arboviral amplification observed during epidemic years. Resident populations can be divided into those that are rare, focal, or widespread. Rare birds, such as pileated woodpeckers, may become infected and, in turn, infect vector mosquitoes. However, because these birds are rare and very patchy in their distribution, it is unlikely that they are responsible for infecting large numbers of vector mosquitoes. Likewise, some avian populations are extremely focal in their distribution. For example, common

grackles are focally distributed geographically and temporally. Common grackle populations are also very cyclic. During some years these birds are extremely abundant and produce huge numbers of offspring. The populations usually build slowly, peak over a 2 - 3 year period and then crash. During peak population years common grackles can be found nearly everywhere, but they are especially abundant around dumpsters associated with fast-food restaurants and grocery stores. Finally, some avian populations are widely distributed both geographically and temporally. Species like mourning doves, blue jays, northern mockingbirds, and northern cardinals are found in large numbers in virtually every Florida habitat, especially suburban residential neighborhoods. Because these 4 avian species are so widely distributed, they can efficiently amplify arboviruses over a large geographic area.

Between 1989 and 1997 we monitored wild avian populations in Indian River County, Florida for antibody to St. Louis encephalitis (SLE) virus. This 9 year period included the large SLE epidemic in 1990. Details of this study can be found elsewhere (Day and Stark, 1999, Avian serology in a St. Louis encephalitis epicenter before, during, and after a widespread epidemic in South Florida, USA, *J. Medical Entomology*, 36:614-633). The study showed that avian infection with SLE virus is relatively rare during inter-epidemic periods. Approximately 1% of the sampled birds were positive for SLE antibody during the non-epidemic years included in the sample period. In contrast, during the autumn of the 1990 SLE epidemic, virtually all of the birds that were captured and bled had SLE antibody, indicating that epidemic amplification was explosive and widespread prior to, and coincident with, the onset of human SLE cases in Indian River County. A second observation made during this study was that common grackles and mourning doves had remarkable breeding seasons during 1990 (the epidemic year), 1991, and 1992. I proposed (Day, 2001, Predicting St. Louis encephalitis virus epidemics: Lessons from recent, and not so recent, outbreaks, *Annual Review of Entomology*, 46:111-138) that a severe winter freeze during Christmas of 1989 killed cold-sensitive ground vegetation in hammocks throughout south Florida and opened these habitats to ground feeding birds such as mourning doves and common grackles. This increased foraging and nesting sites for these species and resulted in increased breeding success during the 3 nesting seasons following the freeze. The spring and summer of 1990 produced a remarkable amplification event for SLE virus in south Florida resulting in an extensive, widespread SLE epidemic from late July through the end of the year.

Since its introduction into Florida in 2001, there has yet to be a significant epidemic of West Nile (WN) virus recorded in the state. Because WN is closely related to SLE, it is likely that WN epidemiology, including avian amplification, will be similar to that of SLE. It is evident that the conditions for significant levels of WN amplification have not yet been present in Florida. When these conditions prevail, watch out. Florida can be expected to record epidemic transmission levels that eclipse what has been previously reported elsewhere in the U. S.

Jonathan F. Day, Professor, Florida Medical Entomology Laboratory
University of Florida, IFAS