

Buzz Words



The Newsletter of the Florida Mosquito Control Association
Nov/Dec 2006

Volume 6, Issue Number 6

2007 FMCA Aerial Short Course Class
January 16 – 18, 2007
Buckingham Army Airfield
Fort Myers, FL

See www.floridamosquito.org for more details
Registration form inside this issue of *BuzzWords*

2007 FMCA Dodd Plenary Short Courses
January 29 – February 2, 2007
Ocala, FL

Course schedule and registration form at www.floridamosquito.org

11th Southeast Regional Public Health Pest & Vector Management Conference
February 20 – 22, 2007
Boardwalk Beach Resort Conference Center
Panama City Beach, FL
<http://www.pherec.org/SEConf2007/SEConfbrochure.pdf>

The 2007 Annual American Mosquito Control Association Conference will be hosted by
the Florida Mosquito Control Association in Orlando, FL
March 31 – April 5, 2007
The Peabody Orlando
www.mosquito.org

Florida Mosquito Control District News

Anastasia Mosquito Control District

The 4th Mosquito and Pest Control Workshop will be held in St. Augustine, Florida, March 27-29, 2007. The registration fee is \$150.00. The Holiday Inn (Beach Blvd) group rate is \$70.00 per night. For more information, please contact Mrs. Gina LeBlanc ginaamcd@bellsouth.net, 904-471-3107, or Dr. Rui-De (Rudy) Xue xueamcd@bellsouth.net, or visit the web page at www.anastasiamcd.org

Lee County Mosquito and Hyacinth Control Districts

On December 7, 2006 the Board of Commissioners for the Lee County Mosquito and Hyacinth Control Districts selected T. Wayne Gale to serve as the new Director for the two Districts.

Wayne has been the Acting Director for the last five months and prior to that served as the Operations Manager for the Lee County Mosquito Control District.

Before coming to Lee County, Wayne served for 21 years as a medical entomologist in the Navy Medical Services Corps and retired as a Commander in 1998. He then spent six years in Tallahassee as the Department of Agriculture and Consumer Services Mosquito Control Administrator and Chief for the Bureau of Entomology and Pest Control.

T. Wayne Gale graduated from Mt. Dora High School in Central Florida and earned a B.S. degree in Agriculture and a M. S. degree in Medical Entomology from the University of Florida. He also earned a M.S. degree in Human Resources from Chapman University in Orange, California.

In sympathy

Nothing Gold Can Stay

Nature's first green is gold,
Her hardest hue to hold.
Her early leaf's a flower;
But only so an hour.
Then leaf subsides to leaf.
So Eden sank to grief,
So dawn goes down to day.
Nothing gold can stay. –Robert Frost

John Lyell Clarke, Jr.

My father, John Lyell Clarke Jr., passed away earlier this month after a long illness. As many of you know, my father was committed to two things in his life: his work and his family. Those two things were his foundation. Everything he said and did centered around them. Over the years, my father developed lifelong friendships with people throughout our industry. He leaves us all with an important legacy – a passion for mosquito control. While he will be greatly missed, his work lives on. Thank you all for your expressions of sympathy. They are very much appreciated by my family. Memorial services were held on Saturday, December 9th at the Riverside Presbyterian Church.
Sincerely, Lyell Clarke

Clay Merriett Richard Wheeler

Services for Clay Merriett and Richard Wheeler were held Tuesday, September 19th, at Whidden -McLean Funeral home in Bartow. A fund has been set up for the Clay and Richard's family at Imperial Polk Credit Union should you wish to contribute. It is located at 1695 North Broadway Ave., Bartow, Fl. 33830. The mailing address is Post Office Box 1363, Bartow, Fl. 33831-1363, and the phone number is (863) 533-8597.

Thank you, Taryn N. Crepeau, Manager, Polk County Mosquito Control

Call for volunteers for 2007 AMCA meeting in Orlando, FL

Committee Chairs for the AMCA Meeting

If you are chairing a committee for the AMCA meeting in Orlando, Florida, please provide a list of the number of volunteers that you anticipate needing for assistance during the meeting. Include a description of the duties, how much time will be requested, and any expertise that is desirable.

Volunteers for the AMCA Meeting

If you are able to volunteer to help out during the meeting, please provide information on how much time you can devote to volunteering, what days you would be available, and any expertise that you have so that you can be assigned to areas that would make best use of your talents.

Areas where volunteers are needed: Bag stuffers (Thursday and Friday only), Banquet, General, Projectionists, Registration, Room Attendants, Silent Auction Drop Off.

Forward all information to George Heinlein at gheinlein1121@hotmail.com or call George at Indian River Mosquito Control District 772-562-2393

Please be aware that registration for the meeting is not automatically waived for volunteers. However, the registration cost for volunteers is at the AMCA member rate, whether or not the

volunteer is an AMCA member. As the host organization, the FMCA is provided a limited number of complimentary registrations for volunteers by the AMCA. Should you need a complimentary registration to participate as a volunteer, please contact Kellie Etherson or Doug Carlson ethersonk@cityofgainesville.org dcarlson1@hotmail.com

Call for PHOTOGRAPHS for the Photo Salon at the April 2007 AMCA meeting

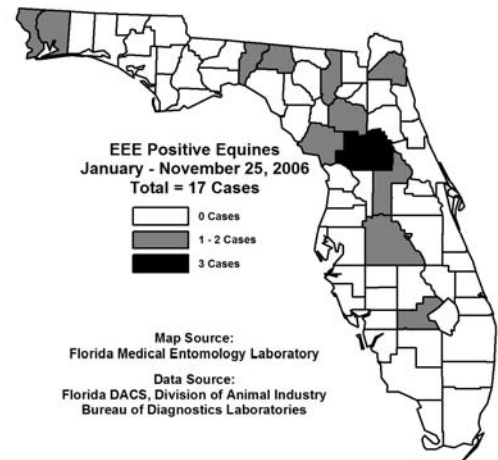
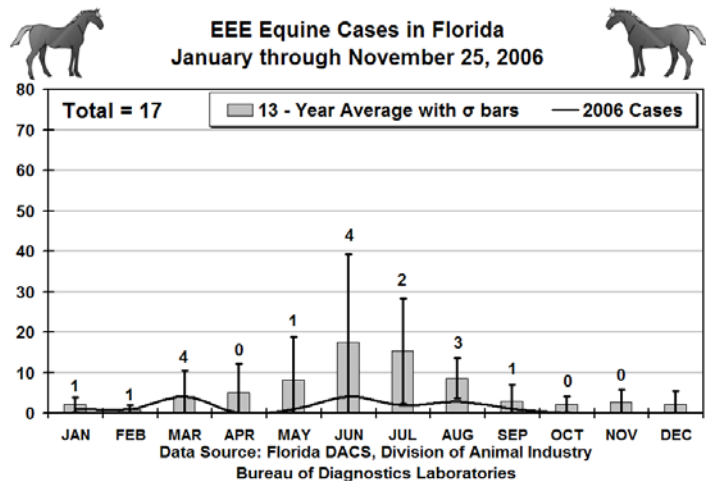
The photo salon is a good chance to relax and mingle with others during a photo slideshow. It will not be a competition, so don't be shy. Please send your digital photographs with a brief description of each photo and the name of the photographer to:

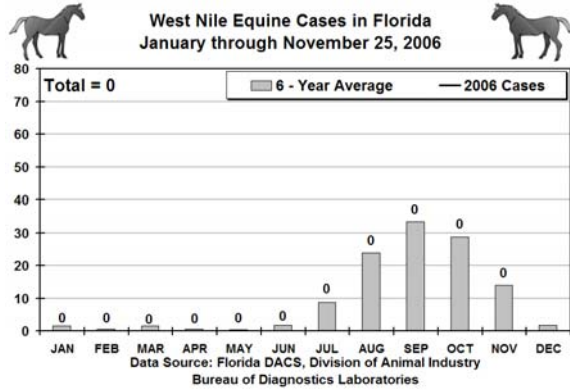
Michael Hudon
Indian River Mosquito Control District
5655 41st Street
Vero Beach, Fla. 32967
772-532-6534

or email them to indianrivermosquito@yahoo.com

Examples of photos we need: Mosquito Biology/Habitat, Water Management, Chemical/Biological Control, General, Humorous, Nature's Beauty, Insects, Previous Meetings

.jpg format preferred, try to keep each picture under 3MB - **Deadline is February 7, 2007**





**2007 Aerial Short Course Class
Sponsored by the Florida Mosquito Control Association
Aerial Short Course Committee**

January 16, 17, 18, 2007 --- Lee County Mosquito Control District

The Florida Mosquito Control Association (FMCA) will once again sponsor an aerial short course at the old Buckingham Army Air Field, which is home to the Lee County Mosquito Control District, 15191 Homestead Road, Lehigh Acres, FL 33971 [telephone number 239-694-2174]. A map is available on the web at WWW.LCMCD.ORG.

Note for Pilots: Radio Frequency 122.9 & Coordinates N26-38.6 & W081-42.6

The class is scheduled for January 16 - 18, 2007. Attendees will be assisted with transportation to and from each hotel to the District, if prior arrangements are made with the Chairperson.

The registration fee for the class [or any portion] is \$125. Any participant wishing to discuss issues involving this class should speak with the Chairperson, Mark Latham [941-722-3720].

Do not send any funds with the registration. Please bring a check with you on the first day of class or January 16, 2007. The check should be made out to the FLORIDA MOSQUITO CONTROL ASSOCIATION. Since the purpose of the short course is to share information among professionals, all participants are requested to pay the registration fee, unless the CHAIR has agreed to waive it. Any organization sending 8 or more students will pay a flat \$1,000.

Local Hotels: Comfort Inn (239-768-0005), Coral Bridge Suites (239-454-6363), Wynstar (239-791-5000), and Holiday Inn Select (239-482-2900). The Holiday Inn Select [prices are \$109 for lower floor and \$129 for upper floor] and the Coral Bridge Suites are recommended. Holiday Inn will be the location of Tuesday & Wednesday night events. The Holiday Inn Select has an airport shuttle.

Please complete this form for each participant and Fax it to 352-334-2286

Name: _____

Organization: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone Number: (____)____-____ Fax #: (____)____-____

Email: _____

Ticks in Florida

Many mosquito control districts also confront issues with ticks. There are likely to be inquiries from the public about ticks and tick-borne diseases, since the local MCD may be perceived as the appropriate place for help regarding any insect which bites humans. Ticks aren't insects, but this is a subtlety often missed by those whose reaction to animals with more than 4 legs or that feed on blood is "go away"! MCD's may also confront ticks while carrying out their own operations; mosquito habitat may also be tick habitat and personnel may be bitten during the course of their activities. Besides the aggravation, this is a concern because of tick-borne disease.

There are numerous tick species in Florida, many of which never bother humans or domestic animals. Ticks are related to spiders and mites; essentially, ticks are giant mites. There are three families of ticks, two of which are in Florida. The Argasidae, or soft ticks, are primarily nest parasites and are generally not pests in Florida. Most of the species of concern in Florida are members of the Ixodidae, or hard ticks. There are five species which frequently bite humans or domestic animals, and a few others that may be of interest. They vary in their host usage, habitat preferences, and disease transmission, and thus in the risk they present to the public and MCD workers.

Hard ticks are obligate parasites, requiring a blood meal once in each stage (larva, nymph and adult). All of the species of concern in Florida are 3-host ticks, so named because they use 3 separate hosts for each meal (Fig. 1). The hosts may be of the same species, but the tick will attach, feed, and then drop off the host each time. Ticks seek hosts by climbing up vegetation (questing) and waiting for a host to contact them. The preferred height and type of vegetation depends on the preferred host, but is typically <1 meter high. While questing, ticks alternate between host seeking in the vegetation and rehydrating on the ground. Contrary to popular opinion, ticks are not found up in trees! Ticks found on your head got there by climbing up after they were on you.

Ixodes scapularis - the black-legged tick. This is also called the deer tick, particularly in northern areas. It is one of the smaller ticks, with the females being red and black and other stages plain brown to black, with no ornamentation. This tick prefers small to medium sized mammals, birds and lizards as larvae and nymphs and larger mammals, such as deer, dogs and humans, as adults (see Fig. 1). This is the vector of the Lyme disease agent, *Borrelia burgdorferi*. The ecology of this species is very different in southern areas than in the north, where many studies have been located. In Florida, the immatures rarely are found on humans or domestic animals. The adults are active from October to May and are the biggest threat to humans. The black-legged tick is found throughout Florida, but typically does not have large populations. It is most commonly found in wooded areas or along the edge of forest patches.

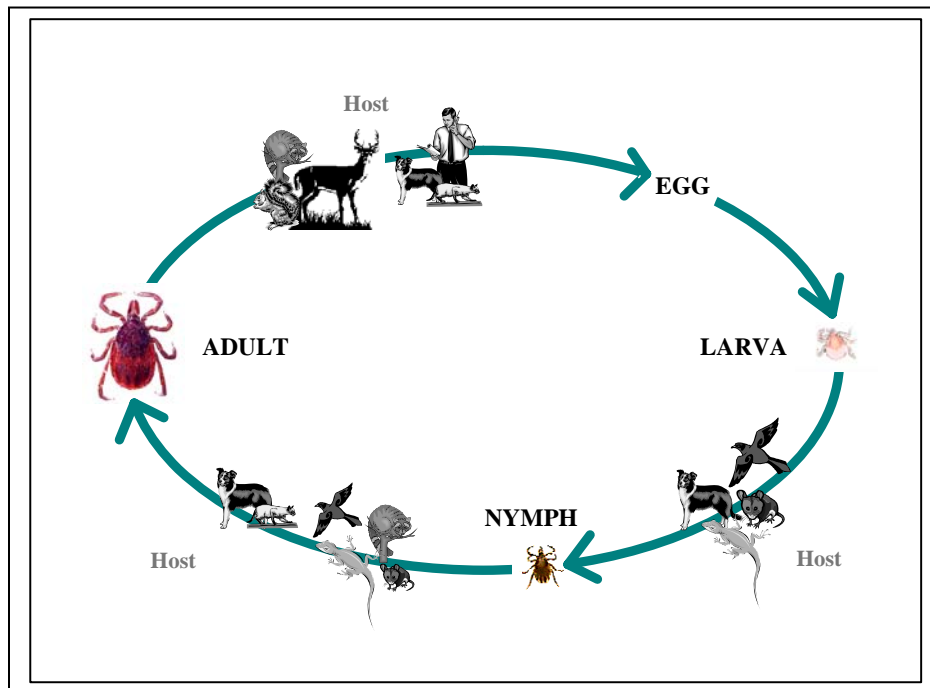


Fig. 1. Life cycle of *Ixodes scapularis*, as an example of a 3-host tick. Note that each stage of the tick uses a different host, but there is substantial overlap in the species fed upon in each stage.

Dermacentor variabilis - the American dog Tick. Found primarily on small rodents as immatures and on larger mammals, including dogs and humans as adults. This is one of the larger ticks in Florida, and the adults are typically brown with white markings. It is a vector of Rocky Mountain spotted fever, *Rickettsia rickettsi*. It is found throughout Florida, most often in open habitats and grassy areas, but also along the edge of wooded areas.

Amblyomma americanum - The Lone Star Tick. This tick is named for the ornamentation on the adult female, which is golden brown with a prominent white spot on the back. All stages of this tick will readily bite humans and domestic animals, and populations can be large enough to be a pest. It has been found throughout Florida, but large populations are generally found in the north and central areas. Its vector status is uncertain, but it has been implicated in the transmission of *Ehrlichia* and *Anaplasma* species, the causative agents of ehrlichiosis in humans and animals, and in Rocky Mountain spotted fever. The lone star tick has a broad host range, feeding on most mammals in all stages and also on birds as immatures. It has broad habitat use as well, and can be found in woods and open areas.

Amblyomma maculatum - the Gulf Coast Tick. This tick is generally only noticed in the adult stages, when it will attach to humans and domestic animals. It prefers large animals such as cattle and deer. It is a very striking tick, gold-brown with white ornamentation. It is not known to vector any disease agents in Florida, but there is concern that it could be an effective vector of heartwater (a severe disease of cattle) if the bacteria became established. It can be found statewide, but generally is rare.

Rhipicephalus sanguineus - the brown dog tick. This tick is cosmopolitan, found throughout the world, and is a specialist on dogs in all stages. It can be occasionally found on wildlife, but this is rare in Florida. All stages will bite humans, but usually only when there is an infestation and then the dogs are removed. This is one of the few, and only one in Florida, hard ticks that will establish a population indoors, in a house or kennel. The ticks will seek out cracks and crevices and retreat deep into the walls between feeding, and are very difficult to control once a population has become established. This species is known to vector *Ehrlichia* species, particularly to dogs, and has been implicated in transmission of Rocky Mountain spotted fever.

A note on taxonomy: as with mosquitoes, the taxonomy of ticks and bacteria is always undergoing revision. Therefore, you will often see different names for ticks and bacteria. Tick phylogeny was revised in 2004 (Barker & Murrell 2004), changing the cattle tick from *Boophilus microplus* to *Rhipicephalus (Boophilus) microplus*. Similarly, the genera *Anaplasma* and *Ehrlichia* were revised (Dumler et al. 2001); this moved *Ehrlichia phagocytophila*, the agent of human granulocytic ehrlichiosis, into the genus *Anaplasma*. The taxonomy of the bacteria which causes Lyme disease, *Borrelia burgdorferi*, is complex. There are several genospecies, and they cause differing pathology in humans. In the US, *B. burgdorferi sensu strictu* is the agent of Lyme disease. However, as we understand this complex interaction between ticks and bacteria more completely, other *Borrelia* species may be shown to cause human disease.

Minimizing tick contact is the best way to reduce the risk of tick-borne disease. Using repellents (those containing DEET are effective), wearing long pants, tucked into boots or socks if necessary, and thorough tick checks after returning from tick-infested habitat are effective methods. Most ticks do not bite immediately, and some, but not all, pathogens are not transmitted until the tick has been attached for 24-48 hours. For attached ticks, the best removal method is to grasp the tick as close to the skin as possible using tweezers or forceps and pull straight back. Do not grab the abdomen of the tick since this injects the gut contents into the host! The wide ranges of folk remedies (Vaseline, oils, heat, twisting) are ineffective at best and can be dangerous.

This is just a quick overview of ticks in Florida. For more information, there will be a tick identification course at the Dodd short courses and there are several EDIS fact sheets available (link: Brown dog ticks, Lyme in Florida, Ehrlichia, Koehler & Castner Fleas & Ticks IN009). Some primary references of interest are:

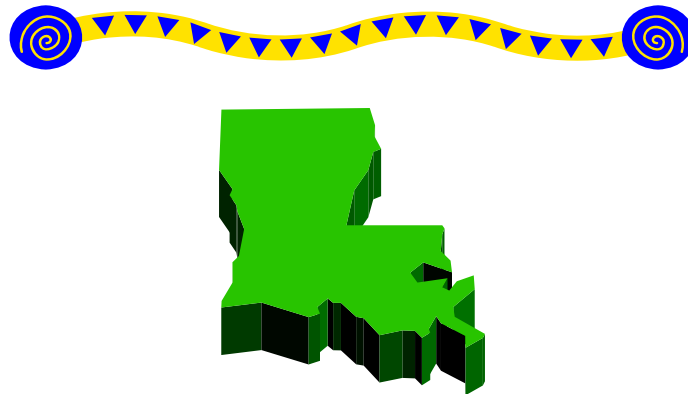
Barker, SC, Murrell, A. 2004. Systematics and evolution of ticks with a list of valid genus and species names. *Parasitology* 129: S15-S36.

Clark, K. 2004. *Borrelia* species in host-seeking ticks and small mammals in northern Florida. *J Clin Microbiol* 42: 5076-5086.

Dumler, J. S., A. F. Barbet, C. P. J. Bekker, G. A. Dasch, G. H. Palmer, S. C. Ray, Y. Rikihisa, and F. R. Rurangirwa. 2001. Reorganization of genera in the families Rickettsiaceae and Anaplasmataceae in the order Rickettsiales: unification of some species of *Ehrlichia* with *Anaplasma*, *Cowdria* with *Ehrlichia* and *Ehrlichia* with *Neorickettsia*, descriptions of six new species combinations and designation of *Ehrlichia equi* and 'HGE agent' as subjective synonyms of *Ehrlichia phagocytophila*. *Int J Syst Evol Microbiol* 51:2145-2165.

Keirans, J. E. and T. R. Litwak. 1989. Pictorial key to the adults of hard ticks, family Ixodidae (Ixodida: Ixodoidea) east of the Mississippi River. *J. Med. Entomol.* 26:435-448.

**Cynthia C. Lord, Associate Professor
Florida Medical Entomology Laboratory
University of Florida, IFAS
Vero Beach, FL**



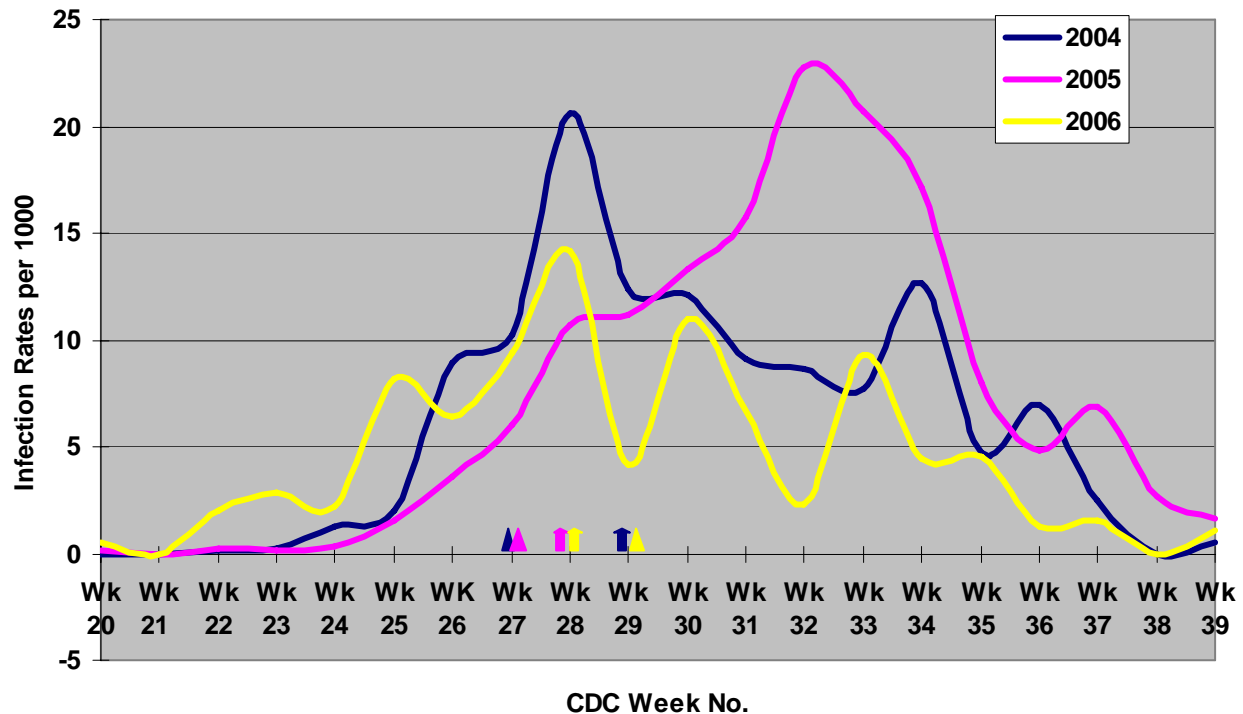
A LOUISIANA PERSPECTIVE ON SENTINEL CHICKEN SURVEILLANCE FOR WEST NILE VIRUS

The Louisiana experience with sentinel chickens for the surveillance of West Nile virus (WNV) is somewhat different from that reported by Walter Tabachnick (*BuzzWords* 6 (4): 6-8). East Baton Rouge Parish (EBRP) expanded its sentinel chicken surveillance program prior to 2002 anticipating that WNV activity in the chickens would precede human infections and give some advance warning. However, EBRP's lazy chickens did not predict the "big event" in 2002 and EBRP cried fowl when the sentinel chickens did not convert until people were infected with WNV in 2003-2006. However, gravid trap collections of mosquitoes did provide site-specific and parish-wide early warning of later transmission of WNV to humans. WNV-positive *Culex quinquefasciatus* females were collected in gravid traps at least two weeks prior to the onset of West Nile symptoms in humans in EBRP in 2003-2006. This allowed EBRP to assess human risk and subsequently identify high risk areas for WNV transmission within the Parish. Mosquitoes from many gravid traps in close proximity to the sentinel chickens showed WNV activity weeks in advance of the onset of WNV symptoms in people. The sentinel chickens did not.

In 2002, we had 13 sentinel chicken flocks in EBRP. The first sentinel chicken tested positive for WNV on June 24, the same day the first person had onset of symptoms. However, *Cx. quinquefasciatus* from gravid traps tested positive on June 11. In 2003 the first human WNV case reported an onset date of July 25, but the first sentinel chicken did not convert until August 13. However, the first *Cx quinquefasciatus* pool tested positive on March 25 and infection rates began to increase sharply in June, preceding human infections by several weeks.

Since 2004, sentinel chicken sera collected in EBRP have been tested using an IgM capture ELISA (CDC protocol) and mosquito pools have been tested with real time RT-PCR by the Louisiana State University Veterinary School Diagnostic Laboratory. Figure 1 depicts a time series of WNV infection rates (Biggerstaff, B.J. 2003 CDC, <http://www.cdc.gov/ncidod/dvbid/westnile/software.htm>) in *Cx. quinquefasciatus* pools collected in EBRP gravid traps during 2004-2006 (prepared by Randy Vaeth, EBRMARC).

Fig 1. WNV Infection Rates in *Cx. quinquefasciatus* in EBRP 2004-2006



Triangles = first human case
Arrows = first positive sentinel chicken

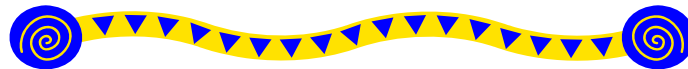
Note that WNV antibody-positive sentinel chickens were recorded after WNV-positive mosquito pools in every year. In 2004 the first human case reported onset in week 27 (CDC Week Numbers), however, the first sentinel chicken was not positive until week 29. Infection rates in *Cx. quinquefasciatus* began to increase sharply three weeks before the human case (week 24). Similarly, the first positive sentinel chicken in 2005 did not test positive until week 28, one week after the first human case (week 27). And the first sentinel chicken did not test positive in 2006 until week 28, only one week before onset of symptoms in the first human (week 29). However, increases in mosquito infection rates preceded human cases by several weeks in all three years.

I do not believe there is a cost savings in sentinel chicken surveillance for WNV in EBRP. Gravid trap mosquito collections and the subsequent analysis of mosquito pools for WNV are relatively inexpensive and there are substantial costs to running a chicken surveillance program, i.e., constructing and maintaining a mosquito-free environment in which to raise the chickens, labor costs to maintain large numbers of chickens in a mosquito-free environment, expensive cages, and the labor and materials to feed and water the chickens in the field. Furthermore, people in urban areas are much more receptive to placing gravid traps on their property, which is very important as WNV activity is greatest in the densely populated areas of EBRP.

WNV transmission in urban areas of EBRP does not appear to be entirely random. In 2002, very few of the 52 cases were from rural areas. All of the human cases (4) in 2003 were from urban areas and two were in close proximity to some of the 2002 cases. We saw a similar pattern of urban human West Nile infections in EBRP during 2004, 2005, and 2006. So, as early as 2003, we began to see clustering of human cases in some urban areas. Therefore, Baton Rouge's experience is somewhat different from what Florida has reported where, to date there has been a noticeable paucity of West Nile human cases. Using a variety of information, including mosquito pools and human case information, EBRP has identified what

appear to be specific foci of WNV transmission. Many housing units in the parish are surrounded by wetlands and woodlots, some of which may serve as refugia for WNV-positive mosquitoes during winter and early spring and WNV amplification foci during spring and early summer. As we learn more about WNV we believe we can identify early season refugia and amplification sites and use this information to direct our vector control efforts. Hopefully, this will help us reduce the frequency of WNV transmission in EBRP. But, based on our previous experience, sentinel chicken arboviral surveillance is not likely to be of much help in this effort.

**Matt Yates, Director
East Baton Rouge Parish Mosquito Abatement and Rodent Control District No. 1
Baton Rouge, LA 70807**



SENTINEL CHICKEN SURVEILLANCE FOR WEST NILE VIRUS

Matt Yates raises important points that need to be carefully considered when embarking on a West Nile virus (WNV) surveillance program. The use of gravid traps to capture ovipositing females (= older females that have blood fed at least once) that are pooled to determine mosquito infection rates has clearly been essential for the identification of high risk WNV transmission foci in East Baton Rouge Parish Abatement and Rodent Control District. Well done EBRPMARC.

A few additional points need to be considered relative to WNV surveillance and disease transmission risk assessment. WNV-positive mosquito pools will always precede WNV antibody-positive sentinel chicken seroconversions when both collections are made in the same location. Seropositive sentinel chickens will always lag behind positive mosquito pools from the same location by at least two weeks – the time needed for newly infected sentinel chickens to produce detectable levels of antibody. Hence, in the context of the EBRP time frames presented above, it is not surprising that WNV-positive mosquito pools preceded the WNV antibody-positive sentinel chickens assuming that all of the sentinel chickens maintained in EBRP were bled weekly. Therefore, whenever there are prior surveillance data that indicate repeated WNV transmission in a particular area, it is prudent to conduct mosquito surveillance and the pooling of gravid females for WNV isolation attempts to obtain a more timely assessment of active WNV transmission. This is precisely what is done by mosquito control workers in EBRP. Their observation that WNV-positive mosquito pools preceded the onset of West Nile human cases in urban settings, while WNV seropositive sentinel chickens did not, is likely a significant observation for WNV transmission dynamics within the EBRP.

Gravid mosquito pools certainly “detect” the presence of WNV prior to the sentinel chickens. This is important if the mosquito infection rates can be used as a gauge for actual later human risk and the magnitude of the risk as we have advocated for sentinel chicken seroconversion data (Tabachnick, WJ. 2004. Sentinel surveillance and human risk for West Nile. *Buzzwords* 4(2): 10-12). The first report of a WNV-positive mosquito pool or a WNV seropositive sentinel chicken (which may also precede the first human case purely by chance) is not always indicative of the risk of a significant epidemic of WNV within a particular surveillance zone. During low transmission years, these positive mosquito pools and/or sentinel chickens serve purely for “detection,” and we should agree that WNV is here to stay in the western hemisphere and no longer needs to be detected. It is the magnitude and timing of mosquito infection rates, and/or the magnitude and timing of the sentinel chicken seroconversion rates that provide the essential information necessary to actually gauge the risk of a significant WNV epidemic in human populations on the local, county, statewide, or regional levels. The EBRPMARC bases its WNV transmission assessments and real-time vector control decisions on data obtained from pools of female mosquitoes collected in gravid traps. This mosquito surveillance system has worked well for the EBRP. Florida has yet to experience a major epidemic of WNV, so the surveillance data that will predict a “big event” in Florida remain unclear. However, many control programs in Florida will continue to rely on the sentinel chicken arboviral surveillance program that has been in place throughout the state since 1977. The resulting long-term surveillance data sets may be complemented by baseline mosquito pool data sets once they become established at already known arboviral transmission sites throughout the state.

The arboviral surveillance issues related to assessing WNV transmission by evaluating large numbers of pooled mosquitoes are discussed in an earlier *BuzzWords* column (Tabachnick, *BuzzWords* 6(4): 6-8). As outlined in this previous *BuzzWords* column, the bottom-line issue that needs to be considered by every arboviral surveillance program is the utility and efficiency of assessing large numbers of mosquito pools, which may provide an earlier indication of later WNV transmission to humans, weighed against the utility and efficiency of a sentinel chicken surveillance program capable of assessing actual transmission, knowing that there is a built-in two week lag between the infection date and the first detectable antibody in the sentinel chickens. The success of either arbovirus surveillance program is contingent upon the assumption that samples are collected from a location where there is actual ongoing WNV transmission. The intensity of that transmission, especially early in the transmission season, will be a major factor in determining how easily arboviral transmission is detected and how far in front of the eventual WNV epidemic curve vector control is initiated.

The value of any arboviral surveillance program is to provide enough lead time for local mosquito control and public health agencies to attempt effective, efficient, and environmentally sound vector control and epidemic mitigation. One thing we have learned during the tenure of WNV in North America is that there is a number of different ways to conduct sound arboviral surveillance. The method of choice used by the EBRP is mosquito pooling. Well done EBRP.

**Walter J. Tabachnick, Director and Professor and Jonathan F. Day, Professor
Florida Medical Entomology Laboratory, University of Florida, IFAS, Vero Beach, FL**

**The deadline for submissions to be included in the Jan/Feb 2007 issue of
BuzzWords is February 10, 2007.**

**Please send change of address or newsletter submissions to:
Roxanne Connelly, Editor, 200 9th Street SE, Vero Beach, FL 32962
or buzzwords@ifas.ufl.edu**