

BUZZWORDS



www.floridamosquito.org

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Deadlines for submissions to be included in the newsletter:

Jan/Feb	Feb 1
Mar/Apr	Apr 1
May/Jun	Jun 1
Jul/Aug	Aug 1
Sep/Oct	Oct 1
Nov/Dec	Dec 1

The mission of the FMCA is to promote *effective* and *environmentally* sound control of disease-transmitting and pestiferous mosquitoes and other arthropods of public health importance, develop and enhance public interest, awareness, and support for the control of mosquitoes, and provide for the scientific advancement of members through our meetings, training and education.

Volume 11. Number 5. Sep/Oct 2011

Upcoming Events

FMCA Aerial Short Course

January 17 – 19, 2012

Lee County Mosquito Control District

<http://www.floridamosquito.org/Events/Aerial.aspx>

FMCA Tallahassee Days

January 23 – 24, 2012

More details inside this issue of BuzzWords

FMCA Dodd Short Courses

January 30 – February 3, 2012

Ocala Hilton, Ocala, FL

North American Black Fly

Association Meeting

February 8 – 10, 2012

Archbold Biological Center

Lake Placid, FL

Contact Elmer Gray for more information:

ewgray@uga.edu

*Life can only be understood backwards; but it must
be lived forwards.*

---Soren Kierkegaard

From the Editor

Please note: The opinions expressed in the articles of this newsletter are just one view. All readers are invited to submit articles, rebuttals to articles, or news items for this newsletter.

In an effort to reduce the amount of paper we use every year and to reduce costs of printing the FMCA Newsletter, I would like to hear from anyone who would like to be added to our email list to receive an electronic version of BuzzWords, and to be removed the mailing list for hard copies. You can contact me at crr@ufl.edu.

Thank you,

Roxanne Connelly, Editor

FMCA Aerial Short Courses (FLY-IN)

Date: January 17th – January 19th, 2012

Tuesday - Thursday

Where: Lee County Mosquito Control District

Buckingham Army Airfield

15191 Homestead Road

Lehigh Acres, FL, 33971

239-694-2174

PREFERRED HOTEL:

Crowne Plaza of Fort Myers

\$99.00/night (King or Double)

13051 Bell Tower Dr., Ft. Myers, FL, 33907

1-800-465-4329

Contact: Mark Latham, Director

Manatee County Mosquito Control

2317 2nd Ave. West, Palmetto, FL 34221

941-722-3720

email: manateemcd@aol.com

FMCA Tallahassee Legislative Days

FMCA's Tallahassee Legislative Days has been scheduled for Tuesday evening (Jan. 24) for dinner and Wednesday (Jan. 25) for the day at the capitol. The 2012 Florida legislative session is scheduled to begin on January 10th, two months sooner than normal, because lawmakers need to work through state and federal redistricting. Please place this important date on your calendar. Your participation is critical this year to help deliver our message to the legislators. Budgets are tight and travel money even tighter, but if you can find the time and funds to attend this all-important event, it would go a long way toward keeping mosquito control issues and needs in the forefront of our legislators' minds. If you can only make it for the day, come Wednesday, January 25th to visit your legislators. It cannot be stressed enough how important your participation is in this event.

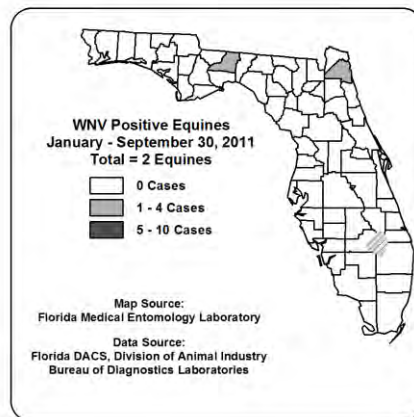
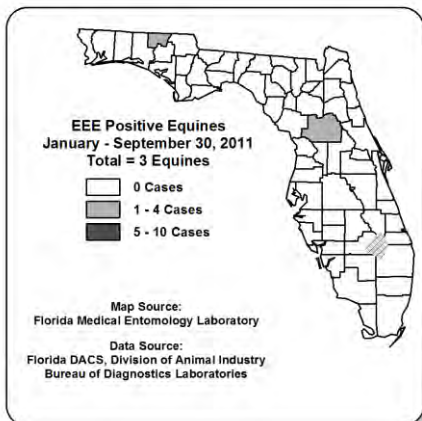
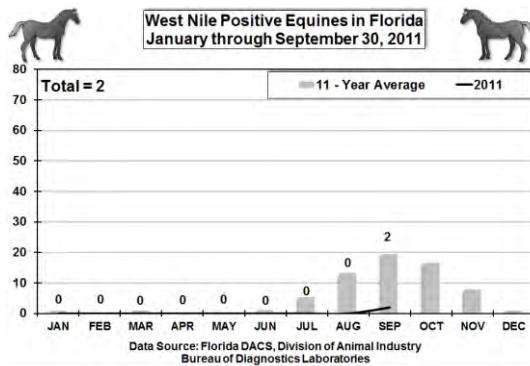
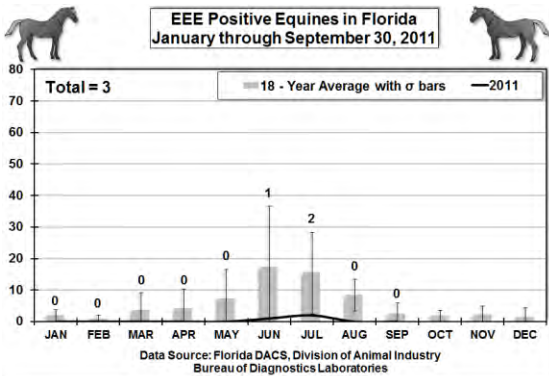
Tallahassee Days 2012 - January 24 - 25, 2012
(Tues/Wed)
Cabot Lodge – Thomasville Road
Room rate - \$109 (Cut-off date for room block 1/10/2012)
Phone: (850) 386-7500
1653 Raymond Diehl Road • Tallahassee, FL 32308
<http://www.cabotlodgethomasvilleroad.com>

We appreciate your support and interest in the Florida legislative process and hope you can find the time to join in our efforts. Additional information for dinner/lunch, talking points, etc. will be available in December. There are a number of important issues coming up, including the complete loss of State Aid funding, possible elimination of special districts and other issues that could have an enormous impact on FMCA, so we implore you to show your support to help to maintain what we currently have. Don't sit back and assume others will carry the ball for you! We sincerely hope to see you in Tallahassee on January 24-25, 2012.

FMCA Legislative Co-Chairs:

Dennis Moore – dmoore@pascomosquito.org

Doug Carlson - doug.carlson@irmosquito2.org



Pasco County Mosquito Control District

Position Opening: Operations Supervisor

Application Process: Interested individuals should submit a cover letter and a current resume that includes three verifiable references.

Please direct all correspondence to:

Pasco County Mosquito Control District
Attn: Dennis Moore, Director
2308 Marathon Rd.
Odessa, FL 33556

or electronically: dmoore@pascomosquito.org

Closing Date: March 6, 2012

Starting Salary: \$55,000

(commensurate with experience)

Anticipated Start Date: April 2, 2012

Excellent Benefits Package. Minimum Requirements: Bachelor's Degree in the Biological Sciences/Entomology is highly preferred, plus 3 years of experience in a mosquito control program or related field. Must be legally permitted to work in the United States. Must obtain a Florida Driver's License and a Public Health Pest Control License issued by the state of Florida within 3 months of employment.

Nature of Work: Employee supervises and coordinates the adult surveillance and ground/aerial adulticiding programs and is responsible for monitoring the larval inspection findings and the adult surveillance results. Duties include oversight of all field staff and direct supervision of any employees while on adulticiding assignments. Technical direction is provided by the Director, but the employee is expected to exercise considerable independent judgment and to accomplish all work with minimal supervision.

Job Description: Position entails very specialized work involving all phases of mosquito control operations with supervisory responsibilities. The operations supervisor will:

- Help to coordinate evaluation of pesticides and calibration of application equipment.
- Manage personnel operating ground adulticiding equipment.
- Plan field operations involving the ground and aerial adulticiding program. Assigns the areas to be treated, schedules and maps the ground/aerial missions, monitors weather conditions and adjusts missions as needed.
- Check the application equipment for compliance with the registered labels.
- Manage the adult surveillance program, including ID work and data entry as needed.
- Handle most of the service requests which are beyond the scope of the receptionist.
- Record and maintain records of the monthly inventory of all pesticides and vehicle usage.
- Manage the sentinel virus surveillance program, including the weekly bleeding of sentinel chickens.
- Initiate or participate in mosquito related research projects.

Knowledge, Skills, and Abilities:

- Thorough knowledge of entomology, ecology of arboviruses and advanced mosquito control techniques.
- Thorough knowledge of all Federal and State regulations pertaining to mosquito control in Florida.
- Knowledge of supervisory practices and the ability to supervise people in heavy work load situations.
- Physical strength and agility to work outside, occasionally under adverse weather conditions.
- Understanding of mosquito trapping and population evaluation principles.
- Ability to establish and maintain effective working relationships with other employees and the public.
- Ability to effectively communicate scientific information to peers and the public.
- Experience in the use of office software such as Excel, Word, Power Point, and GIS software such as MapInfo or ArcGIS; ability to prepare reports, graphs, charts, or other visual data.

Building a Successful Gambusia Hatchery

Gambusia, commonly called Mosquito Fish, have been used as a biological mosquito control agent by mosquito control personnel for over 100 years. Many mosquito control agencies around the world utilize these larvivorous fish as an integral part of their integrated pest management program. Once a healthy population of *Gambusia* is established the need for further mosquito control measures is often times eliminated.

Considerable time, money and effort were being expended collecting *Gambusia* for mosquito breeding area stocking. Often, the best collecting areas were 35 to 40 minutes away from our office and then another 35 to 40 minutes away from the area needing stocking. Thus, the decision was made to raise our own *Gambusia* at the shop. Having experience with both open and closed fresh and salt water systems during my tenure at FSU's Turkey Point Marine Laboratory, I undertook the task of designing and implementing the hatchery.

Gambusia can survive in water as cold as 40 degrees F. or as hot as 105 degrees F. although they fail to reproduce at temperatures below 65 degrees F. This information led to my decision to build a greenhouse to house the hatchery. With the addition of an exhaust fan and roof vents the temperature can be held below 100 degrees F. in the summer and above 65 degrees F. in the winter. Although the hatchery has not yet been operational during the winter, I am hopeful our temperate climate here in Central Florida will allow me to maintain warmer water and fish breeding throughout the year without the need for heaters.

Gambusia need a minimum of 11 hours of sunlight a day to reproduce. I installed lights on a timer to be used when the days are too short to promote reproduction. If I can simulate summer time conditions year round the fish should reproduce year round. I expect the supply of fish to be depleted during the mosquito season and replenished in the off season.



I have two breeding and two holding tanks of 150 gallon capacity each. The tanks are actually plastic livestock watering troughs purchased from a local farm supply store. The two breeding tanks are plumbed to ½ horse power above-ground swimming pool pumps with over flows into the holding tanks. One breeding and holding tank set is for fresh water and one set is for salt water. If only fresh water fish are needed, one pump would be sufficient for all four tanks. The pumps are controlled by a timer which runs at ½ hour increments, giving the fish time to rest from the current.

Being live bearers, *Gambusia* fry need a place of refuge to hide until big enough to elude being eaten by the adults. To provide this refuge I installed floating aquatic plant mats in my breeding tanks. When the plants grow the roots extend down in the water column giving the fry ample places to hide. The holding tanks have no plants in them which aids in removing the fish for stocking and determination of stock availability. The plants also promote better water quality. Pickerelweed

[*Pontederia cordata*] was used for the plant material in the freshwater tank and Smooth Cordgrass [*Spartina alterniflora*] was used for the salt water.

Gambusia thrive in waters from fresh (0 parts salt per thousand) to seawater (32 to 35 parts salt per thousand). As Volusia County has both extensive salt marshes and fresh water swamps and containers, I wanted to be able to provide fish for all habitats. I am maintaining my salt water tanks at 15 parts per thousand in the hopes of reducing the shock to the fish when they are stocked in salt water. All of the fish harvested from fresh water

survived the transfer to the salt water tanks and should be able to withstand another transfer to more saline water.

The wild-caught fish harvested for breeding stock came from many different locations throughout Volusia County. I collected fish from as many different locations as possible to increase genetic diversity and promote disease resistance. Approximately 200 fish were harvested for breeding, 100 in freshwater and 100 in saltwater. The fresh water tanks are producing fry and have already provided over 300 adults for stocking in mosquito-breeding areas with an estimated 400 to 500 available. The salt water tanks have yet to produce young although many of the females appear to be gravid. This delay could be the effect of transfer from fresh to salt water. My long range goal is to be able to provide at least 2,000 fish for stocking per month.



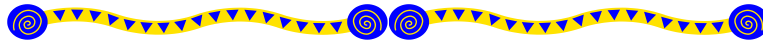
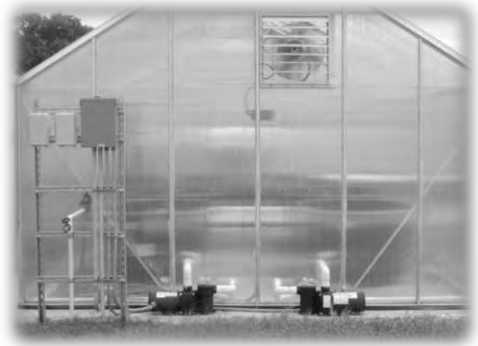
Many thanks go to everybody at Volusia County Mosquito Control for helping me to complete this project. Further information can be obtained from the following sources:

-*Gambusia affinis* Effectiveness In New Jersey Mosquito Control: www.rci.rutgers.edu/~insects/gamb2.htm

-Alabama Vector Management Society:
www.alabamavms.org/Gambusia.htm

-Journal of the American Mosquito Control Association Bulletin No. 7
Volume 23. "Biorational Control of Mosquitoes"

Bill Greening, Environmental Specialist II
Volusia County Mosquito Control



A Ray of Sunshine in the Fight Against Dengue

A long-held dream in medical entomology has been to use genetic strategies to replace populations of a mosquito vector with mosquitoes of the same species that are incapable of pathogen transmission. A prime target for this strategy has been the replacement of wild, pathogen-competent *Aedes aegypti* with *Ae. aegypti* that are incapable of transmitting dengue viruses (DENV serotypes 1, 2, 3, and 4).

Hoffman et al. (2011) have used *Wolbachia pipientis*, a bacterium they obtained from the fruit fly, *Drosophila melanogaster*, as a vehicle to successfully accomplish one part of this long sought goal. Prior studies showed that this particular strain of *Wolbachia*, called wMel, had the capability of interfering with dengue transmission by *Ae. aegypti* that had been infected with the bacterium and then infected with DENV without substantial reduction in the competitive fitness of the *Wolbachia*-infected mosquitoes. This made for an excellent prospect for a successful dengue control strategy.

Wolbachia have long been studied because they provide excellent vehicles for such a population replacement strategy. These bacteria have the capability of spreading through natural insect populations on their own. This can be accomplished artificially by releasing a few *Wolbachia*-infected individuals of selected insect species into natural populations. The spread of *Wolbachia* through a population is due to host cytoplasmic incompatibility

caused by *Wolbachia* itself. The embryos of non-*Wolbachia* infected host females die when these females mate with a *Wolbachia*-infected male. *Wolbachia* infected females do not suffer at all and can mate with both uninfected and *Wolbachia*-infected males. Since *Wolbachia* are passed from females to their offspring through maternal inheritance, there is a mating bias favoring females with *Wolbachia*-infected offspring. The *Wolbachia*-infected insects increase while uninfected insects decrease in frequency and *Wolbachia* spreads rapidly through the population.

A major step forward in implementing this strategy for DENV and *Ae. aegypti* is the report of the first field test that demonstrates the release of wMel *Wolbachia*-infected mosquitoes will spread through an *Ae. aegypti* population and rapidly replace the field population with wMel *Wolbachia*-infected mosquitoes that should not be susceptible to infection with DENV (Hoffman et al. 2011). During a 10 week period the authors released 141,600 wMel *Wolbachia*-infected adult *Ae. aegypti* at one location and 157,300 wMel *Wolbachia*-infected adults at a second site in northeastern Australia. Trapping demonstrated that the frequencies of *Wolbachia*-infected *Ae. aegypti* at both locations reached 100% and continued well after the releases were discontinued. It works!

This is the first demonstration of the potential for this novel strategy in the fight against DENV. Certainly, if successful, this strategy could be used for other vector-borne pathogens if suitable naturally or artificially constructed *Wolbachia* populations can be found that interrupt vector transmission of the particular pathogen.

There is much more that needs to be done before this strategy can be widely used in actual dengue control. Even though wMel *Wolbachia* spread easily through a natural *Ae. aegypti* population, further testing will be needed to assure that the *Wolbachia*-infected mosquitoes maintain the desired trait in nature and cannot transmit DENV. Further tests will also be needed to assess how the wMel *Wolbachia* interacts with other *Ae. aegypti* populations elsewhere in the world to ensure that it spreads and has the desired effect of interrupting local DENV transmission in other areas of the world. Finally wMel will have to be assessed against all the other DENV serotypes under a variety of laboratory and field conditions.

This work represents a great step forward. Just think about a future where the threat of DENV from *Ae. aegypti* in a place like Key West is no longer a concern. Consider that it is now within the realm of possibility to change the *Ae. aegypti* populations in Key West, rendering them ineffectual disease vectors, by using a low cost release of *Wolbachia*-infected *Ae. aegypti*. Then all mosquito control would have to deal with is to prevent these mosquitoes from being pests and biting people!

Reference

Hoffman, A. A. et al. 2011. Successful establishment of *Wolbachia* in *Aedes* populations to suppress dengue transmission. *Nature* 476: 454-457.

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