

## Special Feature

# Current Topics in Medical, Urban, and Veterinary Entomology 4th MUVE Roundtable: 58th Mississippi Entomological Association Annual Meeting

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## Introduction

Four years ago, when we held the first roundtable discussion in association with the annual Mississippi Entomological Association (MEA) meeting, our goal was to promote interaction across disciplines among people with common interests in medical, urban, and veterinary entomology. We certainly realized that goal this year. We had more attendees than any prior years and the discussion was lively. The 4th MUVE roundtable discussion took place at the Bost building on the Mississippi State University campus during the 60th annual MEA meeting. We had published the MUVE mission statement and issued an open invitation this year to anyone who wanted to attend. At the meeting, we loosely followed the outlined list of topics, but allowed the discussion to yield to the various interests of the group. Names and contact information of the participants are provided at the end of this article. Discussion of these topics is summarized below.

## West Nile Virus (WNV)

The Mississippi department of health regularly traps and tests mosquitoes for West Nile Virus (WNV). Information about infection status of the mosquitoes is then shared with Dr. Roger Nasci, chief, Arboviral Disease Branch of the Centers for Disease Control and Prevention (CDC), Division of Vector-Borne Diseases in Fort Collins, CO. Interestingly, a testing site in Mississippi in an upscale urban neighborhood

recently resulted in the collection of 3,000 *Culex quinquefasciatus* mosquitoes trapped in one night. Home misting systems for mosquitoes are sometimes used to protect people from the pests. One drawback to these systems is that non-certified personnel change the pesticide tanks, rendering the application of the pesticide unregulated. There is also a problem with the concept behind the home misting system in that it does not distinguish between pests and beneficial insects in its killing ability. On the brighter side, the laboratory rat LD50 for a promising new mosquito control product recently made available is 46,000 mg/kg (meaning it's very safe).

One prevailing theory is that storm drains contribute to the WNV problem. WNV seems cyclical now, and depends on the bird population. Birds tested in Louisiana are currently negative for WNV, which supports the theory that the infection is cyclical. The year 2002 was the peak year for WNV cases in horses throughout the US. However, the year 2012 has seen a record number of WNV cases in humans nationally. At this time in Mississippi there have been 233 cases including 5 deaths (people aged 75 and older). By tracking cases, it was demonstrated that Jackson was a hot spot which substantiates the assumption that WNV is primarily an urban disease. Only 20% of affected people show signs or symptoms of disease, but it has not been determined how quickly it takes a person to show these signs once they become infected. This and other questions remain as unanswered research topics. As research funds become available, pressing research questions such which genotypic WNV isolates are found in Mississippi need to be addressed. Importantly, there are already educational programs throughout the state, although there are no radio or TV ads due to additional expense for these ads.

The health department has determined that after spraying near a wooded area, approximately 42% mosquito control is achieved. The method of using spray trucks for mosquito control has the undesirable effect of harming beneficial insects in residential yards. A preferred approach is to test for larvae in standing water (the dipstick technique). A positive dipstick result precedes onset of illness in people by approximately one month. Larvae collected this way are pooled and tested for WNV. However, despite the availability of the information that positive larvae results precedes onset of illness due to WNV, it is difficult to convey the urgency of personal protection against mosquitoes to the public! A potential, very valuable application of the information regarding the one month lead time would be for the protection of children in a daycare setting. A viable scenario would be to alert parents that there are

positive mosquitoes in the neighborhood, so they could send DEET with their children to daycare and request that it be applied to their children during the day. They could also request that the children not be permitted to play outside. The importance of this information needs to be conveyed as a top priority and resources need to be made available to daycare workers.

In Louisiana there have been approximately 300 cases of WNV so far this year including at least 10 deaths. There have been outbreaks in other southern states including Texas which has reported the highest number of cases and deaths in the US. Birds are also being tested for WNV. Infection rate appears to be higher in birds that do not migrate. Also, a diverse bird population is less likely to have positive results for WNV. However, more research is required to determine the role of birds in the epidemiology of the disease.

In summary, there are a number of areas that this group could target for research if funds could be made available.

### **Hairy Crazy Ants**

Hairy crazy ants, also known as Raspberry crazy ants found in Florida, Louisiana, Mississippi, and Texas, may all be the same species, known as Hymenoptera: Formicidae: *Nylanderia pubens fulva*. The Entomological Society of America (ESA) is attempting to establish a common name, and has suggested the name Tawny. Hancock and Jackson counties are the principle counties affected in Mississippi. There are approximately 20 affected counties in Florida.

Current research focuses on cold tolerance of these ants as a means of predicting the northern extent of migration. Joe MacGown at MSU has produced an impressive video showing the invasion of these ants in coastal Mississippi (<http://www.youtube.com/watch?v=vSwlfUXeEwU>). The ants can nest in hay, but little is known about them as far as measures necessary to control them. They are not controlled in their native country. There may be natural plant repellants, but any chemical application is thought to be short-lived. There are now approximately 30 exotic ants in Mississippi whereas there were only about 10 a decade ago.

**Forensic Entomology**

There has been a lot of interest generated in forensic entomology recently, partially due to the popularity of TV shows such as CSI. However, in the academic setting, there is not a clear path for students with genuine interest in forensic entomology to pursue education and certification in the field. There are currently only 16 board certified forensic entomologists in the entire US, with none in either Mississippi or Alabama. There is no state agency representing the field, but individuals may charge a small lab fee for consulting on court cases in forensic entomology. Although we encourage student involvement in the field, the coursework and process of becoming board certified in forensic entomology is not standardized.

It was suggested that we consider creating a position, such as an extension position staffed by an individual who could promote interest in the process of becoming board certified in forensic entomology. This person would have knowledge and insight into the process. Distance learning in forensic entomology is offered at some universities to support different learning styles and schedules. The MUVE group could be tasked to develop a proposal for distance education courses in forensic entomology in BCH-EPP at MSU and delineation of an extension position.

**Specialty in Veterinary Entomology**

Since the inception of the MUVE roundtable in October 2009, a number of discussion topics have arisen with particular importance to veterinarians. If we could get the word out to the College of Veterinary Medicine well in advance of the MEA meeting, we would likely have a large group of veterinarians and veterinary students interested in participating in this roundtable discussion. We may need to coordinate with the CVM to encourage participation by providing credit for students who participate in this discussion. There are some universities, such as Cornell, that have a Veterinary Entomology program involved in research and extension activities tasked to benefit beef, dairy, and poultry producers in New York. The Veterinary Entomology strategies are guided by their integrated pest management (IPM) program and functions in conjunction with the Dairy and Field Crops program. The Veterinary Entomology program at Cornell provides resources to the entire New England region and is the only program in the U.S. which continuously works to improve IPM strategies on dairy farms. Mississippi State University BCH-EPP informally works with veterinarians on entomology-related issues, but could benefit from formalizing this relationship by creating a Veterinary Entomology program similar to the one at Cornell in order to support

producers throughout the state and the southeastern region and to generate interest and support from students, staff, and faculty at the CVM.

The Entomological Society of America also recognizes a MUVE section which deals with insect interactions with other animals, including humans. Similar to the MEA MUVE roundtable, topics for the ESA MUVE group include medical entomology, urban entomology, and veterinary entomology, but also forensic entomology, epidemiology, integrated disease management, human and veterinary parasitology, public health pest management, mosquito control, management of structural pests (e.g., termites, ants), and others. Since our discussions continue to include these additional areas, we may need to make sure that MEA MUVE explicitly encompasses them in its mission statement.

### **Future Issues**

Vector-borne disease threats are among the most complex and difficult to predict or control. The resulting diseases often infect both people and animals. West Nile Virus is a prime example. There are other arthropod-transmitted viruses that pose a potential threat such as yellow fever, La Crosse, eastern equine encephalitis, and Chikungunya. Chikungunya virus is transmitted by mosquitoes common in the southern US and is considered an imminent threat to the US. Although Lyme disease is generally not seen in Mississippi, there are numerous other vector-borne diseases that are a threat in the southern region, including Rocky Mountain Spotted Fever, ehrlichiosis, anaplasmosis, and Dengue fever. Dengue fever alone is responsible for millions of cases worldwide. According to the CDC, approximately 75% of recently emerging infectious diseases affecting humans are diseases of animal origin and approximately 60% of all human pathogens are zoonotic. MEA MUVE is poised to address such threats in its mission.

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**Table - 4th Annual Medical Urban Veterinary Entomology (MUVE) Roundtable Mississippi State University (MSU) 60th Annual Mississippi Entomological Association (MEA) Meeting**

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