

# 2013 ANNUAL PROGRAM REPORT



ANASTASIA MOSQUITO CONTROL DISTRICT  
OF ST. JOHNS COUNTY

500 Old Beach Road  
St. Augustine, FL 32080

[www.amcdsic.org](http://www.amcdsic.org)

(904) 471-3107



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# PREFACE:

## A MESSAGE FROM THE DIRECTOR

There was a mosquito population outbreak in late May due to heavy rain fall in early May, 2013 and 60 sentinel chickens tested positive for WNV, EEE, & HJ in 2013. One horse tested positive for EEE and there were two imported Dengue fever human cases in St. Johns County in 2013. The residents and tourists in St. Johns County have been free of any local acquired mosquito-borne diseases for 10 years.

AMCD & USDA/CMAVE successfully organized the 10th Arbovirus Surveillance and Mosquito Control Workshop and provided 20 CEU credits, organized AMCA's symposium on *Aedes albopictus* in Atlantic City, NJ, Feb 24-28, 2013, co-organized the 3<sup>rd</sup> International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases, Suzhou, May 27-31, 2013, and hosted an Area-wide Mosquito Control Lessons Discussion Group Meeting, December 16-18, 2013. AMCD trained 6 intern students in the summer and cooperated with the University of Florida to train a Ph.D. student and the student as Co-PI received \$89,000 grant funds through UF from DACS to study on Attractive Toxic Sugar Bait's impact on honey bees. In 2013, a total of more than \$30,000 grant funds were received from different agencies to help our district programs.

Mr. Gene Wells retired in October after almost 34 years of service as an inspector and mechanic for the District. I was awarded the Florida Entomological Society's Annual Achievement for Research award this year (2013) during their annual meeting in Naples, Florida, July 16-19, 2013.

I do appreciate and thank the Board, all employees, citizens, contractors and cooperating agencies and personnel for their support and service to AMCD's programs.



## A MESSAGE FROM THE CHAIRPERSON

Thank you to all of our dedicated employees for all of their hard work, along with the support from the Board of Commissioners, and to the residents of St. Johns County and other cooperating organizations for their support to keep our citizens and tourists free from mosquito-borne diseases.



### **BOARD OF COMMISSIONERS:**

Mrs. Jeanne Moeller, Chairperson  
Mrs. Catherine Brandhorst, Vice-Chairperson  
Ms. Vivian Browning, Secretary/Treasurer  
Ms. Janice Bequette, Commissioner  
Mr. Gary Howell, Commissioner

### **APPOINTED OFFICERS BY THE BOARD:**

Dr. Rui-De Xue, Director;  
Mr. Wayne Flowers, District Attorney;  
Ms. Julieann Klein, CPA



## PERSONNEL

ADMINISTRATION	HIRE DATE
Dr. Rui-de Xue, Director	4/14/03
Charolette M. Hall, Admin. Asst.	11/5/07
Scott Hanna, Accountant	7/9/07
Jodi Scott, Ed. Specialist	8/13/12

BASE STATION	
Kay Gaines, Supervisor	8/7/00
Inspector Sprayers: (Base)	
Ken Daniel	9/26/05
Tom Downey	3/1/06
Greg Griggs	4/15/91
Cathy Hendricks	7/8/02
Patrick Kendrick	4/7/03
Ricky Stockley	2/4/13
David Strickland	3/10/97
James Wynn, Mechanic	3/4/96

NORTH & SOUTH STATIONS	
David Taylor, Supervisor	2/28/94
Inspector Sprayers: (North)	
Ryan Grubbs	2/4/13
Tyler Kersey	3/25/13 Resigned 12/4/13
Vincent Price	6/1/99
Elaine Scanzani	3/20/02
Paul Whatley	7-8-02 Retired 5-31-13
Gene Wells	11-26-79 Retired 10-31-13
Inspector Sprayers: (South)	
Freddie Allen	7/8/02
Steven Solana	4/24/00

ENTOMOLOGY DEPT.	HIRE DATE
Alice Fulcher, Biologist	01/07/13
Mike Smith, Biological Tech.	11/05/84
Richard Weaver, Data Mgr.	04/14/03

SEASONAL - FT (6 Months)	To 10-31-13 unless stated
Jacob Cryer	05/01/13
James Deadwyler	05/01/13
Michael Geiger	05/01/13
Deirdra Humphrey	05/01/13
John McClure	05/01/13
Barry Scott	05/01/13
Ronald Steinmueller	5-1-13 to 9-19-13
Dennis Thierrien	5-1-13 to 6-14-13
Michael Vaughn	05/01/13

INTERNS & VOLUNTEERS	
Claudia Davidson	5-29-13 to 7-31-13
Tanjim Hossain	5-27-13 to 7-31-13
Rachel Shirley	6-17-13 to 8-16-13
Emily Thomson	9-3-13 to 12-19-13
Lin Zhu, Volunteer	5-29-13 to 7-31-13
Emily Shirley, Volunteer (Ofc)	6-24-13 to 7-19-13
Dr. Chun-Xiao (Tracy) Li, Visiting Scientist	09/15/13 to 10-15-13



## COMMITTEE MEMBERS 2013

### **SAFETY COMMITTEE:**

**Safety Coordinator:** Mr. Richard Weaver, (Chair)

**Supervisor:** Mrs. Kay Gaines, (Base Station)

**Employees:** Base Station: Mr. Ken Daniel, Mr. Ricky Stockley; North Station: Mr. Eugene Wells, Mr. Vincent Price; South Station: Mr. John "Freddie" Allen, & Mr. Steven Solana

### **APPLIED RESEARCH COMMITTEE:**

**Commissioner:** Ms. Janice Bequette (Chair)

**Biologist:** Mrs. Alice Fulcher

**Data Manager:** Mr. Richard Weaver

**Biological Technician:** Mr. Mike Smith

**Education Specialist:** Ms. Jodi Scott

### **EDUCATION COMMITTEE:**

**Commissioner:** Mrs. Jeanne Moeller, (Chair)

**Education Specialist:** Ms. Jodi Scott

**Supervisor:** Mrs. Kay Gaines, (Base Station)

**Biologist:** Mrs. Alice Fulcher

**Employees:** Mr. Patrick Kendrick (Base Station), Mr. Vincent Price (North Station), and Mr. Steven Solana (South Station)

### **FINANCIAL / AUDIT COMMITTEE:**

**Commissioner:** Ms. Catherine Brandhorst, (Chair)

**Accountant:** Mr. Scott Hanna

**Director:** Dr. Rui-De Xue

**Supervisor:** Mr. David Taylor, (North & South Stations)

**Administrative Assistant:** Ms. Charolette M. Hall

### **EMERGENCY RESPONSE COMMITTEE:**

**Supervisor:** Mrs. Kay Gaines, (Base Station),

**Data Manager:** Mr. Richard Weaver,

**Biologist:** Mrs. Alice Fulcher,

**Supervisor:** Mr. David Taylor (North & South Stations)

**Education Specialist:** Ms. Jodi Scott

### **OPERATIONAL COMMITTEE:**

**(Ground/Aerial)**

**Commissioner:** Mr. Gary Howell (Chair)

**Director:** Dr. Rui-De Xue

**Biological Technician:** Mr. Mike Smith

**Supervisors:** Mrs. Kay Gaines, (Base Station), Mr. David Taylor (North & South Stations)

### **PLANNING COMMITTEE:**

**Commissioner:** Ms. Vivian Browning, (Chair)

**Director:** Dr. Rui-De Xue

**Supervisor:** Mrs. Kay Gaines (Base Station)

**Data Manager:** Mr. Richard Weaver

**Biologist:** Mrs. Alice Fulcher



## COOPERATIVE ORGANIZATIONS

### *Professional Services*

The Anastasia Mosquito Control District of St. Johns County (AMCD) works in cooperation with a number of related local, state, and federal agencies, private and commercial organizations, and members of the medical community. Those listed below briefly describe the work associations with AMCD in 2013 to prevent and control vector-borne diseases in Florida:

#### INTERNATIONAL COOPERATION AND SERVICE:

The Hebrew University of Jerusalem, Israel (Dr. Gunter Muller) about attractive toxic sugar baits, repellents and barrier treatment. Dr. Muller spent 1-2 months at AMCD and Dr. Xue visited Mali's field site.

Beijing Institute of Microbiology and Epidemiology (Dr. Tong-Yan Zhao & Dr. Chun-Xiao Li) about repellents, behavior, traps, and equipment evaluation & organized international meeting, Suzhou, May 2013.

AMCD hosted an attractive toxic sugar bait group meeting, Feb 21-23, 2013.

AMCD hosted an area wide mosquito control group meeting, December 16-18, 2013.

Dr. Xue gave a presentation about globalization impact on mosquito-borne diseases and repellent for other potential use at the 3rd International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne, Suzhou, China, May 27-31, 2013. Dr. Xue gave a seminar about surveillance and control of mosquitoes at Shanghai CDC and a seminar about dengue fever and WNV response in Florida at Kunming, China (Inst of Biology), May 21-22, 2013. Dr. Xue reviewed repellent grant application for CZECH Science Foundation at their invitation. Dr. Xue consulted 2 proposals for dengue vector control in Saudi Arabia.

#### NATIONAL AND FEDERAL AGENCIES & ASSOCIATIONS:

US Department of Agriculture / Center for Medical, Agricultural, and Veterinary Entomology. AMCD continued to cooperate with USDA/CMAVE to organize the arbovirus surveillance and mosquito control workshop and AMCA symposium. Dr. Xue was invited to review/evaluate ARS's senior scientists.

Navy's Center for Entomological Excellence, Jacksonville, FL. AMCD continued to cooperate with NCEE for the hand thermal foggers and barrier treatment machine.

Federal Bureau of Investigation. Dr. Xue continued to consult with the FBI agent about the outreach and prevention of bioterrorist threats.

Dr. Xue was appointed as Mosquito Research Foundation's research review committee member to review 42 grant applications.





## COOPERATIVE ORGANIZATIONS

### *Professional Services ~ (Cont'd)*

#### NATIONAL AND FEDERAL AGENCIES & ASSOCIATIONS: (Cont'd)

American Mosquito Control Association (AMCA) and Florida Mosquito Control Association (FMCA): AMCD is a sustaining member of the AMCA and FMCA. Also, AMCD is the AMCA/EPA's PESP member. Dr. Xue and Dr. G. Clark organized a symposium about *Aedes albopictus* for the AMCA annual meeting and attracted many audiences to attend. Dr. Xue gave several presentations at the AMCA meeting and reviewed /published manuscripts for the JAMCA. AMCD Commissioners and staff attended the FMCA's Tallahassee Legislation Day, gave 7 presentations at the FMCA annual meeting. Dr. Xue continues to serve the FMCA's publication committee as a member and Mr. R. Weaver continues to serve the FMCA's financial committee as a member.

Entomological Society of America (ESA) and Society of Vector Ecology (SOVE): Dr. Xue reviewed several manuscripts for the Journal of Medical Entomology, Environmental Entomology, Acta Tropic, Parasitology Research. Dr. Xue served as a committee member of the 6th International Congress of the SOVE and award committee member.

Florida Association of Special Districts (FASD) and Florida Entomological Society (FES). AMCD is a member of these societies.

#### STATE AGENCIES AND UNIVERSITIES:

Cornell University: AMCD attended the dog heart worm survey project in Florida.

University of Florida/Department of Entomology and Nematology, AMCD cooperated with UF to train a Ph.D. Student. AMCD has a non-fund agreement about research on weather detection with UF's Department of Electronic Engineering.

University of North Florida, Jacksonville. AMCD cooperated with UNF to train a masters degree student.

University of South Florida. AMCD cooperated with USF to study sugar feeding and virus detection and dengue vector study.

University of Miami. AMCD cooperated with University of Miami to train their students in the summer. AMCD has a non-fund agreement for applied research and student training. Dr. Xue has been appointed as the adjunct professor in the University of Miami's Medical College.

Department of Agriculture and Consumer Services (DACS). AMCD has an operation contract with DACS about monthly reports and mosquito population surveillance. Dr. Xue serves the research committee.

Department of Health (DOH). AMCD cooperated with DOH to conduct a sentinel chicken program for the surveillance of arbovirus and news release about mosquito-borne diseases in St. Johns County. Dr. Xue was appointed as a St. Johns County Health Leadership Council member.

#### COMPANIES AND OTHER DISTRICTS:

AMCD cooperated with American LongRay to evaluate their barrier spray equipment, with Clark to host the ATSB group meeting, with Barry Tyle for a new formulation of larvicide test, Central Life for a new adulticide evaluation, and Volusia MCD for *Aedes albopictus* surveillance.

#### OTHER SERVICES:

Reviewed many manuscripts for several journals, such as Journal of Medical Entomology, Acta Tropic, Journal of the American Mosquito Control Association, and Parasitology Research.



## PROGRAM OVERVIEW:

The AMCD staff, located in three stations in St. Johns County, Base, North, and South Stations provide the following services: conduct emergency vector control when weather occurrences happen; provide assistance in coordinating issues related to the management of mosquitoes; work with and provide public education to the community, local organizations, schools, homeowners associations, etc. to minimize the impact of mosquitoes on St. Johns County residents and to better inform our public and to assist them in helping control the mosquito population; conduct surveillance continually to help reduce the mosquito population to reduce the chance of human virus association, and to protect the environment; larvaciding and adulticiding as needed, especially during the season from March through November; applied research to test ideas and products, to help reduce the mosquito population; and provide employee training to keep up with modern equipment and methods in the control of mosquitoes.

### The MISSION and GOALS of AMCD



To preserve and protect the people from mosquitoes and mosquito-borne diseases, To reduce / control mosquitoes through integrated pest management based on environmentally friendly and cost effective methods, To minimize negative impacts on people and other living things based on valid scientific data, peer review and public hearings, To spend public funds prudently, and To become recognized as one of the leading mosquito control districts.

## 1 BUDGET

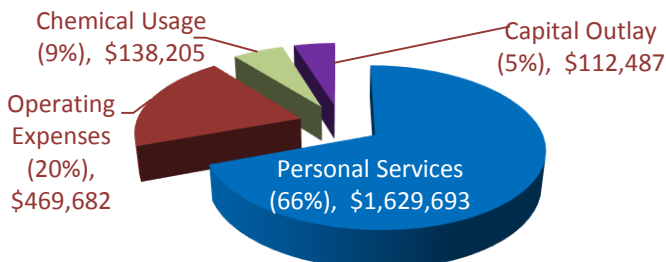
### 12/13 District Revenues

Total \$2,272,241

**Ad Valorem** (real property) **taxes** are the primary source of revenue for Anastasia Mosquito Control District. Despite the District's levying a consistent millage rate of **.1325** for the last five years, decreasing property values have led to decreased tax revenues.



- Ad Valorem Taxes  
\$2,186,435
- Prior Year Tax Distrib.  
\$6,425
- Interest Income \$7,384
- Intergovernmental  
\$18,500
- Grants \$28,198
- Other \$25,298



### 12/13 District Expenditures

Total \$2,350,067

In response to declining revenues, the District has **reduced expenses**, and suspended some long-term capital outlay programs to maintain consistent levels of service.



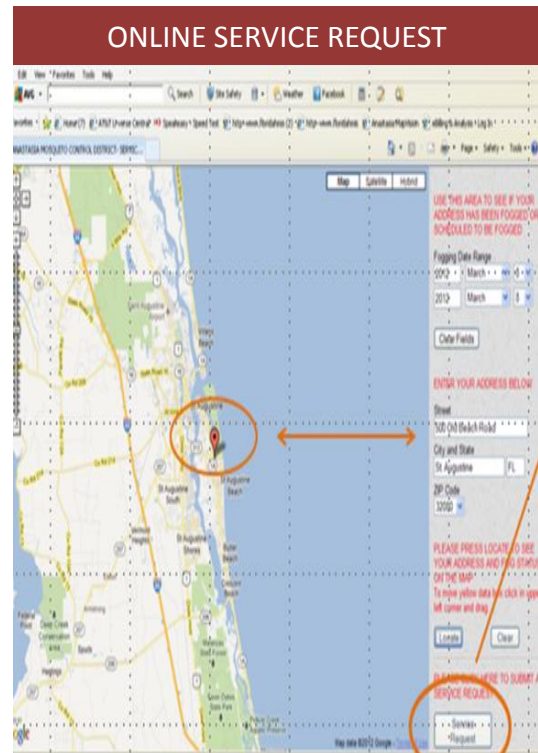


## 2 CUSTOMER SERVICE

AMCD's MapVision computer software program continued to be a valuable tool in 2013 for customer service requests and fogging information. From our website, our St. Johns County residents are able to check to see if their address had been or was scheduled to be fogged and to enter their own service requests.

However, the VCMS database has become outdated and can no longer support the needs of AMCD. Therefore, in September 2013, the Board approved the development of a contract and in December 2013 the contract was approved with Mobisoft Infotech, LLC, who is partnering with the Engineering Department of the University of Florida, to design and build a new VCMS/Mapvision like database.

We continued to provide service to residents and answer concerns about adult mosquitoes, larvae, fogging and/or spraying. The staff also helped residents by giving out information on pesticide safety, mosquitoes and other insect identification, pesticide applications, personal protection methods, mosquito prevention, commercial mosquito traps, repellents and insecticides, assisting residents with concerns about no spray areas, such as; bee keepers properties or personal conditions that warrant no spraying. Staff also assisted the public by distributing Gambusia, the fish that feeds on mosquito larvae.



This year, 2013, AMCD answered 2,959 service requests from local residents by phone, online through our website, and by e-mail, fax, and walk-ins.

### WEB PAGE:

We frequently updated our AMCD website in 2013 to keep our St. Johns County residents informed, as well as, providing information on fogging and for residents to be able to enter service requests online.

AMCD's website ([www.amcdsjc.org](http://www.amcdsjc.org)) continued to provide the following information: important links, public notices, meeting dates, illness advisories, training and workshop information, education opportunities, mosquito biology, and much more.

AMCD is also active on Facebook and Twitter and hosts an online survey to determine customer satisfaction.



### 3 OPERATION CONTROL

#### LARVICIDES AND LARVICIDING:

The District primarily used Bti to kill larvae, then Methoprene products .

Inspectors treated 2,728 times on a total of 18,077.76 acres for larval control.

#### SOURCE REDUCTION & BIOLOGICAL CONTROL:

440 used tires were collected and removed by AMCD inspectors for source reduction. Inspectors emptied numerous containers in residential yards when they performed their inspections. AMCD provided mosquito feeding fish (Gambusia) for the new retention ponds and ditches.

#### ADULTICIDES AND ADULTICIDING:

AMCD continued to use the Permethrin product (Aqualure 20-20) for ULV spraying. A total of 389,995.9 acres were treated. DUET was used for hand thermal fogging. Mosquitomist Two was used for salt marsh mosquito control. Also, barrier treatment was conducted several times in parks and special areas. Most of this was conducted for mosquito populations and WNV vector control.

#### AERIAL SPRAY:

Because there was no huge outbreak of the mosquito population, AMCD did not conduct an aerial spray in 2013.

LARVICIDES AND ADULTICIDES USED IN 2013			
<u>LARVICIDES</u>	<u>AMOUNT USED</u>	<u>AREA TREATED</u>	<u>TIMES APPLIED</u>
Altosid WSP	17,354.0 ea.	53.78 acres	302
Altosid XR	397.0 ea.	.91 acres	21
Altosid XRG	2,079.0 lbs.	346.50 acres	116
Aquabac 200G	160.0 lbs.	26.67 acres	3
Aquabac XT	1,101.6 gal.	17,623.52 acres	2139
Bti Briquets	102.0 ea.	.23 acres	10
GB1111	78.5 gal.	26.15 acres	137
<u>ADULTICIDES</u>	<u>AMOUNT USED</u>	<u>AREA TREATED</u>	<u>TIME APPLIED</u>
Aqualure 20-20	387.9 gal.	376,638.61 acres	303
Duet	60.5 gal.	6,338.19 acres	142
Mosquitomist Two	39.1 gal.	7,001.47 acres	15
Talstar P	6.1 gal.	17.63 acres	20

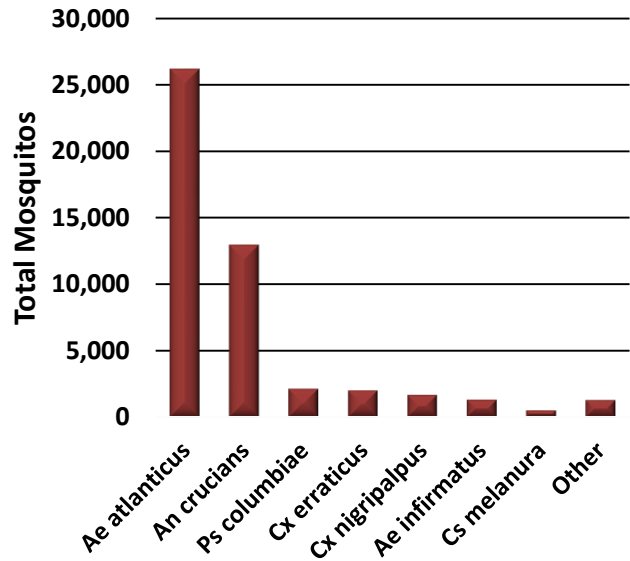


## 4 SURVEILLANCE

### MOSQUITO-BORNE DISEASES:

AMCD cooperated with the Florida Department of Health to monitor imported mosquito-borne disease through local health providers. AMCD monitored West Nile Virus (WNV), Eastern Equine Encephalitis virus (EEE), Saint Louis Encephalitis Virus (SLE), Highland James virus (HJV) and California Group Virus, using 10 sentinel chicken sites around St. Johns County. In 2013, there was 2 imported dengue fever cases, and no locally-acquired human case for dengue fever or other mosquito-borne diseases. We bled chickens every Monday, from March to December and sent the blood samples to DOH's Arbovirus Laboratory in Tampa for testing. In 2013, a total of 60 sentinel chickens tested positive for arboviruses: 4 for HJ, 25 for EEE, and 30 for WNV.

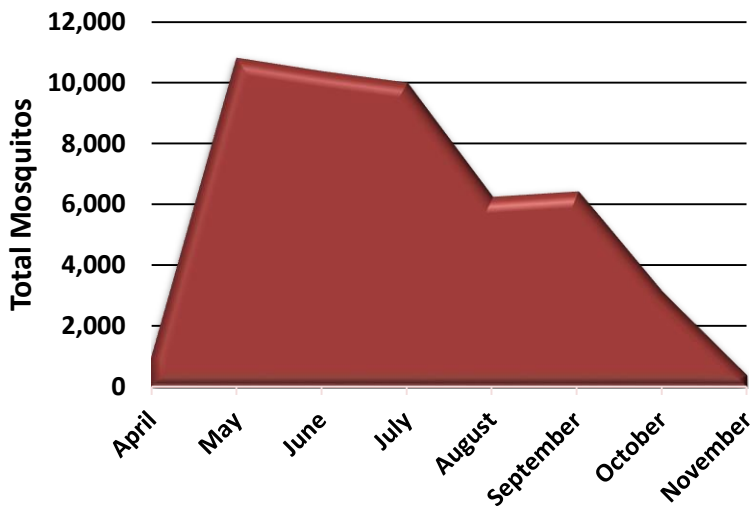
### Yearly Totals by Species



### MOSQUITO POPULATION:

The adult mosquito population was monitored by 39 CDC light traps baited with Octenol from April 9 to November 26, 2013. A total of 48,365 mosquitoes (29 species) were collected in 2013. Also, 7 CDC light traps baited with dry ice were used for a state surveillance program. A total of 289,093 mosquitoes (27 species) were collected.

### 2013 CDC Light Trap - Octenol



### ENVIRONMENTAL PARAMETERS:

Rain falls were monitored by 61 rain gauges and the tides were monitored by 2 tide gauges at the Base Station 3 times a week.

A larval survey was conducted by dipping every Tuesday and Thursday and irregular times, a total of 93,921 dips were conducted and 9,419 dips were positive with 37,917 larvae found.



## 5 APPLIED RESEARCH

### 1. HAND THERMAL FOGGER EVALUATIONS:

**Objective:** 1) Compare characteristics of Bonide Fog Rx, Black Flag, and Burgess Insect foggers; 2) Compare efficacy of the three machines with their pesticides against three species of caged mosquitoes; and 3) Compare efficacy of the three machines with DUET against three species of caged mosquitoes in collaboration with the Navy Entomology Center of Excellence.

**Results:** The machines varied in general characteristics. The Bonide machine maintained integrity and durability for the longest period of time compared to the other two machines. When testing the three machines with DUET, mortality was highest with the Bonide and lowest with Burgess machine. Data showed statistical significance between all machines. The distance away from the fogger nozzle affected mortality for the 3 cages of mosquitoes (*Aedes*, *Anopheles*, and *Culex*).

### 2. FIELD COMPARISON OF A NOVEL TRAP-MOS HOLE WITH BG SENTINEL TRAP & MOSQUITO MAGNET X TRAP TO COLLECT MOSQUITOES.

**Objective:** 1) To evaluate the Novel Mos-hole trap; 2) Compare efficacy of the new traps with BG Sentinel traps & MMX traps in collecting *Aedes albopictus*; and 3) Compare the attractants at all three field test sites.

**Results:** MMX traps collected the lowest number of species and total number of mosquitoes compared with BG and Mos Hole traps. BG Sentinel traps collected more *Aedes albopictus* and *Psorophora columbiae*, compared with Mos Hole traps. The Novel trap, Mos Hole traps collected more species of mosquitoes and total numbers of other mosquito species compared to BG Sentinel traps. After switching lures, Mos Hole traps still collected higher numbers of mosquitoes. The Novel trap is an additional tool for surveillance and control of mosquitoes.

#### APPLIED RESEARCH PROJECTS 2013

Pyriprox/ATSB plant wash
ATSB/Pyriproxifen, <i>Aedes albopictus</i>
Dry Sugar/Water and <i>Ae. albo</i> survival
Storm drain acoustic units
Mosquiron IGR in storm drains
Mos-Hole Trap
ASB Barrier Treatment and <i>Ae. taenians</i>
Vegetation, service requests and mosquitoes
<i>Psorophora</i> blood feeding, engorgement
Repellents and <i>Psorophora</i> spp.
Trap assessments
Hand held fogger evaluations
Light Trap evaluation
Sticky Trap Lab Evaluation
Sticky Trap Weathering Evaluation
Barrier Treatment with Longray machine
Resistance Testing
MMX Gravid trap modification evaluation



Weather monitoring devices and fogging

BG / MMX trap modification evaluation

Dish soap mortality bioassay





## 5 APPLIED RESEARCH (CONT'D)

### 3. COMPARISON OF FIVE LIGHT TRAPS, FIELD COMPARISON OF THREE NOVEL MOSQUITO LIGHT TRAPS WITH NEW JERSEY TRAP, AND CDC TRAP TO COLLECT MOSQUITOES

**Objective:** Three new light traps, compared with standard CDC trap and New Jersey trap, were tested in Northeast Florida. A total of 5 types of light traps including 3 new traps (a yellow bulb trap and a black UV trap from China, and a black UV trap from Iowa), CDC trap (standard), and New Jersey (oldest) trap and two attractants (Octenol and BG lure) were evaluated for the natural population of mosquitoes and non-target species.

**Results:** 1) With or without attractant (Octenol and BG lure), the Black Trap collected two times higher the number of mosquitoes than the CDC trap. 2) With or without attractant, the Yellow Trap collected the largest number of non-target insects including moths, beetles etc. 3) The UV trap collected much more love bugs than the other four traps. From the results of the field evaluation, the Black Trap seems to be a very good trap to collect mosquitoes and could be used for mosquito surveillance.

### 5. REPELLENT EVALUATION WITH WILD FLOODWATER MOSQUITOES

**Objective:** Laboratory evaluation of Citronella, Picaridin, and Deet against *Psorophora ciliata* and *Psorophora howardii*.

**Results:** This is the 1<sup>st</sup> study about repellent against the large mosquitoes. DEET protected for 5 hours and 41 minutes, Picaridin protected for 3 hours and 46 minutes, and Citronella protected for 2 hours and 26 minutes.

### 4. BARRIER TREATMENT WITH BIFENTHRIN AND NEW LONGRAY MACHINE

**Objective:** 1) Evaluate a new Longray truck mounted 4 nozzle fogger, its efficacy and coverage with a Bifenthrin barrier treatment, monitored by trapping in the field and through leaf bioassays in the lab using *Aedes aegypti* adult mosquitoes for a month, post treatment. The project is in collaboration with UF and NECE.

**Results:** Trapping results from pre-treatment to post-treatment suggest the barrier treatment reduced the population of mosquitoes in treated areas for a few weeks, compared to the controls. Additionally, leaf bioassays confirm the efficacy and persistence of treatment on adult mosquitoes. The machine created good coverage of chemical on barrier vegetation, with an additional benefit of a good depth of spray to 18' within the vegetation for resting and sugar feeding mosquitoes of multiple species.

### 6. NEW IGR EVALUATION IN STORM DRAINS

**Objective:** Evaluate Mosquiron CDRs in storm drains or catch basin systems both downtown and in drains connected to retention ponds; collect environmental and field data to identify challenges to efficacy of chemical; monitor wild larvae in water samples taken from the field in the laboratory.

**Results:** 3rd and 4th instar larvae showed the highest mortality; tidal surges, coupled with rain events = low efficacy; Mosquiron CDRs applied after street and drain cleaning by municipalities provide some control; non-target organisms showed low to no mortality in treated versus control storm drain samples; Not all storm drains are created equal and Inspector/Sprayers are crucial for continued monitoring and control of storm drain larvae; heavy rains challenge chemical efficacy; education of homeowners and businesses: yard debris and pollution challenge chemical efficacy.

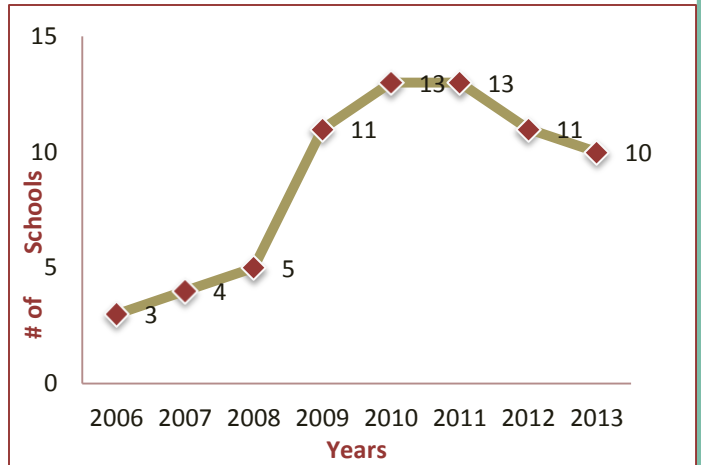


## 6

## EDUCATION AND TRAINING

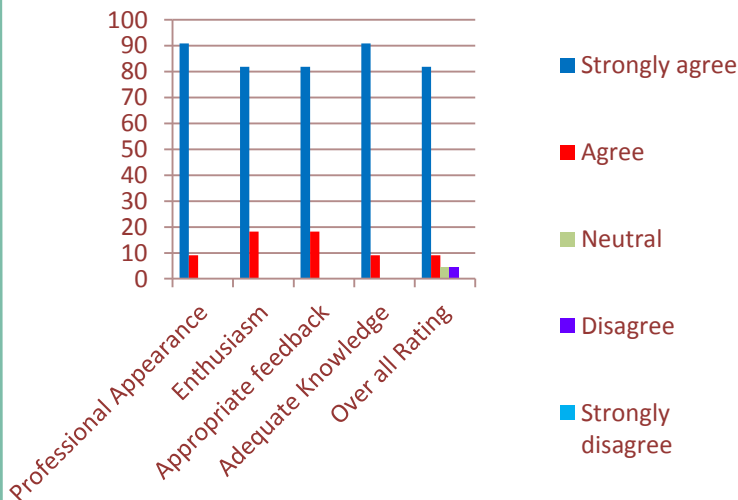
### EDUCATION/SCHOOL PROGRAMS:

AMCD currently teaches Kindergarten, 1<sup>st</sup>, 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> grade, as well as high school programs within the St. Johns County public school system. Education Specialist, Jodi Scott, along with other AMCD staff, employ a variety of teaching methods and hands on science based labs to educate students on mosquito biology, ecology, control & prevention. Each lesson is geared to students' specific intellectual capacity and aligned with Florida's Next Generation Sunshine State Standards. In 2013 AMCD utilized 2 to 4 staff members each time in teaching at 10 public schools throughout St. Johns County, Ketterlinus, Liberty Pines, Osceola, Wards Creek, Otis Mason, Hartley, South Woods elementary schools, Landrum Middle School, and the St. Johns Technical High School. AMCD taught approximately 1,019 students from March through November.



### TEACHER SATISFACTION:

At the end of the 2013, a Teacher Satisfaction survey was distributed to all teachers whose classes participated in the AMCD Educational Program. 100% of the teachers we surveyed said they would recommend the AMCD Education Program to other teachers and school.



**Statement 1** - AMCD staff exhibited a professional appearance.

**Statement 2** - AMCD staff demonstrated enthusiasm throughout the lesson.

**Statement 3** - AMCD staff provided appropriate feedback to students.

**Statement 4** - AMCD staff demonstrated adequate knowledge of the subject.

**Statement 5** - Please rate your approval of the AMCD educational program taught at your school.

The AMCD Education Program plans to continue distributing the Teacher Satisfaction Survey to all participating teachers so that data from different school years can be compared and aims to increase teacher satisfaction levels in the following years.



# 6

## EDUCATION AND TRAINING (CONT'D)

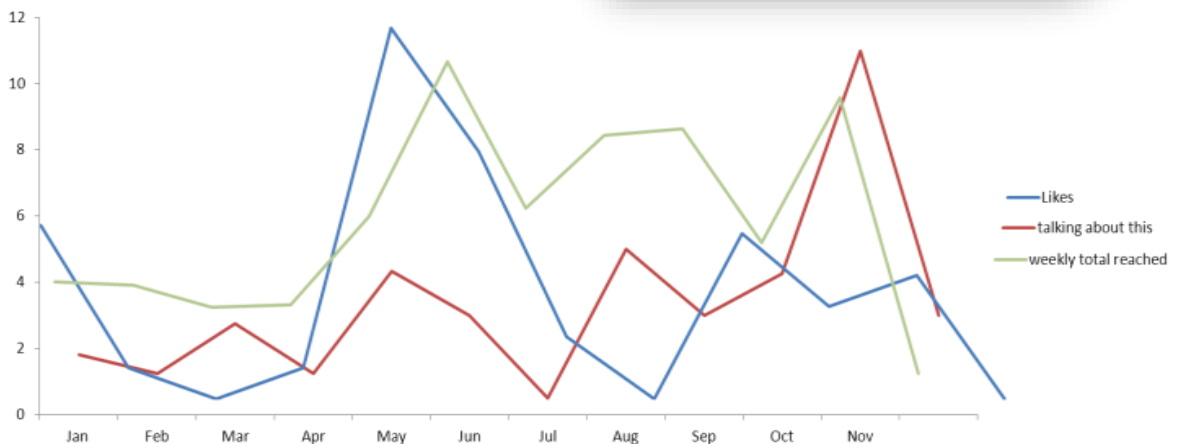


### COMMUNITY EVENTS/PUBLIC OUTREACH:

To increase public awareness, AMCD staff performs continuous public outreach and offers a variety of community educational programs. In 2013, AMCD staff participated in and presented information at 25 community events and public outreach programs.

### SOCIAL NETWORKING:

As part of the goal of increasing public awareness about of mosquito biology, ecology, control & prevention, AMCD created a social networking page on the Facebook website. This social networking page allows AMCD to connect to St. Johns County residents, answer questions, share photos, and post news stories and research article about mosquitoes.



The graph above shows the steady progression of the AMCD's facebook activity in regards to facebook users who visit the page each month, like the page, post on AMCD's wall, visit the page each week and the number of friends/followers the page has. Due to the recent popularity of social networking sites such as facebook, AMCD intends to continue connecting with St. John County residents with this site and aims at increasing the number of individuals reached for next year.



## 6 EDUCATION AND TRAINING (CONT'D)

### 2013 CUSTOMER SATISFACTION SURVEY RESULTS

In previous years AMCD has continued to gauge our customer satisfaction by utilizing new survey methods: door hangers and internet surveys. There were 55 physical surveys returned and 63 internet surveys returned, for a total of 118 returned surveys.

The data was combined and then compared. The graph below represents the percent of customers who overall agree to each of the following questions:

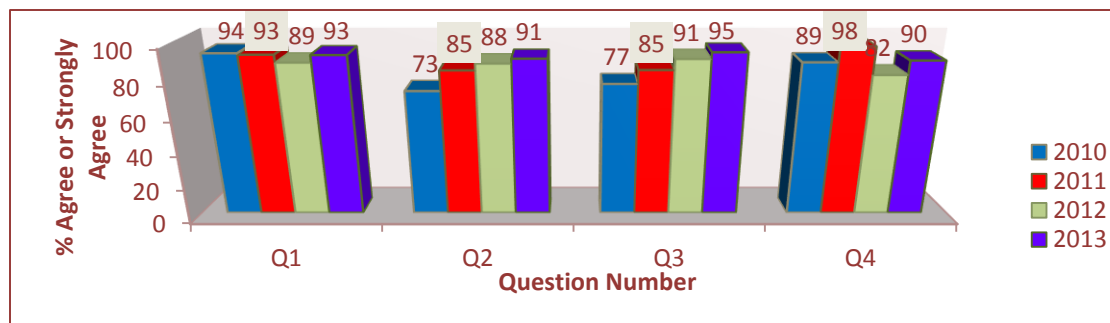
**Question 1** - The goal of AMCD is to preserve and protect the community from mosquitoes and mosquito-borne diseases by reducing nuisance and disease spreading mosquito populations.

**Question 2** - AMCD staff is informative and professional.

**Question 3** - AMCD responds to my service requests within the standard 1-2 business days.

**Question 4** - I am aware of the measures I can take to protect myself from mosquitoes and mosquito-borne diseases by practicing the 5 D's of Prevention.

These results show that in 2013 AMCD not only surveyed more St. Johns County residents but also increased the satisfaction of its customers.



### AMCD EMPLOYEE CONTINUING EDUCATION & TRAINING COURSES

Universal Waste, Sexual Harassment, Diversity	PPE Demo & Test, Labels, Hazardous Communication, VCMS & PDA	Fire safety, Heat Illness, Safety Manual, Thermo-fogger Use
Fire safety, Universal Waste, Arbovirus, Plants and Mosquitoes, Habitats, Personal Protection/Repellent, Sexual Harassment, Diversity	Pesticide use, Labels, MSDS & Procedures, VCMS Review & Training, Heat Illness, New Employee Safety, Hazardous Communication, Safety Manual	PPE Demo & Test, Labels, Thermo-fogger Use, Hooking up & Backing up Trailers, ATV, Duck, Ranger Operation, Back Pack Fogger Operation, Service Requests, Adulticide Operations, Larvicide Operations, Moquito Biology, Bio Medical Waste
CPR & First Aid	Research in Mosquito Control	OSHA Training - Changes to Hazmat Communications.
Universal Waste, Bio-medical, Fire safety, Heat Illness, Sexual Harassment, Diversity, Labels, Hazardous Communication, PPE Demo & Test	Universal Waste, Bio-medical, Fire safety, Heat Illness, Sexual Harassment, Diversity, Labels, Hazardous Communication, PPE Demo & Test Additional Days	

# 7

## ADMINISTRATION / SUPPLY

**BUDGET:** AMCD lowered the millage rate from 0.1325 (where it has been for the last several years) to 0.1312 for FY 13/14.

**BOARD BUSINESS:** AMCD staff provided many documents to board members for meetings throughout 2013. AMCD staff supported 15 Board meetings.

**INSURANCE:** The Board renewed the health, dental, and life insurance, as well as the fleet insurance.

**INVENTORY:** The annual inventory, monthly tire and chemical inventory were done regularly. Two (2) trucks and other items were surplus in 2013.

**POLICIES:** Staff continued updating the District's Policy Manual, including the Employee Handbook and the Commissioner Handbook during 2013 as policies were updated, changed or added.

**CONTRACTS:** Bids were done for 2 new trucks and a fence for our State Road 16 property in 2013 and an RFP was done for the Chemical Storage Building for on our State Road 16 property and for a lease of our Ponte Vedra Property. AMCD also developed a contract with Mobisoft Infotech, LLC, who is partnering with the Engineering Department of the University of Florida, to design and build a new VCMS/Mapvision like database.

**PERSONNEL:** Biologist, Alice Fulcher was hired on January 7, 2013, Paul Whatley, Inspector/Sprayer, retired from the North Station on May 31, 2013, Eugene Wells, Mechanic, retired from the North Station on October 31, 2013. Tyler Kersey, the new inspector resigned on December 4. Nine seasonal employees worked for AMCD from May to October. Six intern students and two volunteers worked for the summer. Two seasonal employees were promoted to full time Inspector/-Sprayers and began February 4, 2013.

### **RECOGNITION/AWARDS:**

Dr. Rui-De Xue was awarded for annual research achievement by the Entomological Society of Florida. Mr. Richard Weaver, Mr. Patrick Kendrick, and Dr. Rui-de Xue received awards for their 10 years of service with the District; Ms. Charolette M. Hall and Mr. Ken Daniel received the Management's Choice awards for their contributions in advancing the goals of the AMCD; and eighteen employees received a safety award.





## 8

# PROFESSIONAL MEETINGS, SYMPOSIUMS, AND WORKSHOPS

Jan. 14-16. The FMCA Fly-In Class, Ft. Myers. Dr. Xue attended the class.

Jan. 28-31. The FMCA Dodd short course, Ocala, FL (Commissioners' J. Moeller, V. Browning & C. Brandhorst and 9 employees took different classes).

Feb. 21-23. AMCD hosted ATSB funded by Gates Foundation's working group meeting.

Feb. 24-28. Commissioners' J. Moeller & V. Browning, and Dr. Xue attended the AMCA meeting, Atlantic City, NJ. Dr. Xue & Dr. G Clark organized a symposium about *Aedes albopictus*: Biology and Control. Dr. Xue gave 3 presentations at the symposium & sugar feeding & ATSB symposium.

Mar. 18-19. The FMCA Legislation Meeting. Commissioners' J. Moeller, G. Howell & V. Browning and J. Scott and Dr. Xue attended the meeting in Tallahassee.

Mar. 27-29. Organized the 10<sup>th</sup> Arbovirus Surveillance and Mosquito Control Workshop. AMCD staff gave 7 presentations.

April 16. Commissioner Howell, Jodi Scott and Dr. Xue attended DACS's WNV meeting, Manatee CMCD.

May 27-31. Dr. Xue co-organized the 3rd International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases, Suzhou, China and gave 3 presentations.

June 18. Hosted Dog Heartworm Survey Cooperation meeting with Cornell University's scientists.

June 21. Held a group meeting with the Navy and UF/DEE's scientists about thermal fogging research.

June 25. Dr. Xue attended FCCMC meeting, Alachua.

July 15-17. Dr. Xue attended the Florida Entomology Association meeting, gave a presentation about toxic sugar baits against *Aedes albopictus* and received the Annual Research Achievement Award.

July 31. Held all employee meeting and 3 intern student presentations.

Aug. 29. Dr. Xue attended DACS Research Committee meeting about grant review. Mr. Weaver attended FMCA Financial Committee meeting in Apopka.

Aug. 30. Mr. Weaver and Dr. Xue attended DACS rule making workshop in Apopka.

Sept. 23-27. Dr. Xue attended the 6th International Congress of the SOVE and gave a presentation about BMP for IMM at the symposium, La Quinta, CA.

Oct. 15. Commissioner Howell, Mr. Weaver, and Dr. Xue attended the FCCMC meeting, Pasco CMCD.

Oct. 31. AMCD held Dr. Li's seminar and mosquito control research presentations. Sixteen people from other districts joined the meeting. 1.5 CEU's provided.

Nov. 14. Commissioner J. Moeller attended the local Legislation Delegation meeting and gave a speech.

Nov. 18-20. Commissioners' J. Moeller, V. Browning & J. Bequette and 6 employees attended the FMCA meeting and gave 7 presentations.

Dec.16-18. Hosted Area Wide Mosquito Control Group meeting.



## 9 PRESENTATIONS AT PROFESSIONAL MEETINGS AND ORGANIZATIONS

**Feb. 25-28. The 79th Annual meeting of the American Mosquito Control Association, Atlantic City, NJ.** R.D. Xue, *Aedes albopictus* control in the oldest city (St. Augustine, Florida) in the U.S. in *Aedes albopictus* symposium. R.D. Xue, Sugar feeding and water drinking: oral administration and application in Florida in Sugar feeding and ATSB symposium.

**Mar. 26-28. The 10th Arbovirus Surveillance and Mosquito Control Workshop, AMCD, St. Augustine, FL.** R.D. Xue, The 3<sup>rd</sup> International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases, Suzhou, China, May 27-31, 2013. W.A. Qualls, Large scale control of *Anopheles crucians* with ATSB barrier treatment and impact on non-target organisms in St. Augustine, Florida. A. Fulcher, Survival of *Aedes albopictus* on native plants in Florida. J. Scott, Direct and indirect spray of the IGRs pyriproxyfen targeting *Aedes albopictus* and *Aedes aegypti* in Northeast Florida. K. Gaines, Aerial spray against outbreak of adult mosquitoes in St. Johns County, FL. J. Scott, Laboratory and field evaluation of tick repellents. R. Weaver, Analysis of pesticide application at AMCD based on VCMS database; M. Smith, The LongRay truck-mounted thermal fogger machine's testing report.

**May 21. Shanghai CDC, China, Seminar.** R.D. Xue, Overview of AMCD's surveillance program and control measurement.

**May 23. Chinese Academy of Medical Sciences/Beijing Union Medical University's Inst of Biology, Kunming, China, Seminar:** R.D. Xue, Response and control of Dengue fever and WNV in Florida.

**May 27-31. 3rd International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases, Suzhou, China, May 27-31, 2013.** R.D. Xue, Conference Presidential Address: Impact of globalization on mosquito-borne diseases. R.D. Xue, Insect repellent for other potential use. ATSB for adult mosquito control.

**July 16. Florida Entomology Association's Annual Meeting, Naples, FL.** R.D. Xue, Evaluation of boric acid mixed with pyriproxyfen sprayed on plants against *Aedes albopictus*.

**July 31. Intern student project reports, AMCD, St. Augustine, FL.** L. Zhu, Body size, blood feeding and fecundity of flood water mosquitoes, *Psorophora ferox*, *Ps. ciliata*, and *Ps. howardii*. C. Davidson, Vegetation density and service request analysis. T. Hossain, ATSB for salt marsh mosquito control. R. Shirley, Trap comparison for collecting *Psorophora* mosquitoes.

**Sep. 23-27. 6th International Congress of the SOVE, La Quinta, CA.** R.D. Xue, Asian Society of the SOVE and Mosquito Control; R.D. Xue, BMP for IMM in AMCD for symposium presentation.

**Oct. 31. Seminar and mosquito research presentations, AMCD, St. Augustine, FL.** C.X. Li, Surveillance and management of *Aedes albopictus* in China. J. Scott, Evaluation of repellents against *Psorophora ciliata* and *Ps. Howardii*. A. Fulcher, Field evaluation of IGRs against mosquitoes in downtown storm drains. R.D. Xue, BMP for IMM in AMCD. R. Weaver, Pesticide application analysis. K. Gaines, Response of population outbreak in May 2013. M. Smith, Novel trap for collection of mosquitoes.

**Nov. 18-20. 85th Annual Meeting of the FMCA, Ft. Myers, FL.** J. Scott, Laboratory evaluation of DEET, Picaridin, and Citronella oil against mega mosquitoes *Psorophora howardii*, FL. R.D. Xue, BEP for IMM in AMCD. K. Gaines, Mosquito population outbreak and control response in St. Johns County, May 2013. M. Smith, Field evaluation of a new trap (Mos Hole) against BG traps to collect *Aedes albopictus*. R. Weaver, Analysis of pesticide application against mosquitoes in St. Johns County in the past 8 years. A. Fulcher, Evaluation of mosquito CRD against *Culex quinquefasciatus* in downtown storm drains. J. Bequette, Intern student program benefits applied research at AMCD.

**Dec. 12. Intern student seminar, AMCD, St. Augustine, FL.** E. Thompson, Sticky traps evaluations.





# 10 PUBLICATIONS

Revay, EE, Junnila, A, Xue, RD, Kline, DL, Bernier, UR, Kravchenko, VD, Qualls, WA, Ghatern N, Muller, GC. 2013. Evaluation of commercial products for personal protection against mosquitoes. *Acta Tropica*, 125:226-230.

Xue, RD, Qualls, WA. 2013. Larvicidal activity of synthetic disinfectants and antibacterial soaps against mosquito, *Culex quinquefasciatus* (Diptera: Culicidae). *Journal of Medical Entomology* 50:137-139.

Naranjo, DP, Qualls, WA, Muller, GC, Samson, DM, Rogue, D, Alimi, T, Arheart, KL, Beier, JC, Xue, RD. 2013. Evaluation of boric acid sugar baits against *Aedes albopictus* (Diptera: Culicidae) in tropical environments. *Parasitology Research* 112:1583-1587.

Alimi, T, Qualls, WA, Muller, GC, Rogue, Naranjo, DP, Samson, DM, Beier, JC, Xue, RD. 2013. Evaluation of a new formulation of Permethrin applied by water-based thermal fogger against *Aedes albopictus* in residential communities in St. Augustine, Florida. *Journal of the American Mosquito Control Association* (JAMCA) 29:49-53.

Henzler, JM, Xue, RD, Thornton, A, Kimball, ME, Shirley, MA. 2013. Mosquito species composition and seasonal abundance in a national estuarine research reserve in Northeastern Florida, Technical Bulletin of the Florida Mosquito Control Association (TBFMCA) 9:13-16.

Qualls, WA, Xue, RD. 2013. Survival of *Aedes aegypti*, *Aedes albopictus*, and *Culex quinquefasciatus* on native plants under laboratory conditions, TBFMCA Vol. 9:17-20.

Xue, RD, Smith, ML. 2013. Field evaluation of Octenol, Lurex 3, BG Lure, and Octenol + Lurex 3 combination as baits in BG-sentinel traps to collect *Aedes albopictus*, TBFMCA 9:21-23.

Revay, EE, Qualls, WA, Xue, RD, Muller, GC. 2013. Evaluation of a portable backyard mosquito mister against *Culex pipiens* and *Aedes albopictus* in Israel. TBFMCA 9:24-28.

Qualls, WA, Xue, RD. 2013. Laboratory evaluation of seven commercial barrier treatment products against *Aedes albopictus*. TBFMCA 9:29-32.

Qualls, WA, Smith ML, Xue, RD. 2013. Successful applications of barrier treatments using Bifenthrin against mosquitoes in St. Johns County, Florida, from 2006 to 2009. TBFMCA 9:33-37.

Xue, RD, Weaver, JH, Smith, ML, Qualls, WA. 2013. Field evaluation of thermal fog application of Sumithrin products against adult mosquitoes in Northeast Florida. TBFMCA 9:38-41.

Xue, RD, Amoo, AOJ, Brown JR. 2013. Field efficacy of ground ULV spray of Aqueslin® against caged *Culex quinquefasciatus* in St. Augustine, Florida. TBFMCA 9:42-44.

Qualls, WA, Xue, RD. 2013. Efficacy of Altosid XR-G exposed to sunlight and temperature variations against four species of mosquito larvae. TBFMCA 9:45-47.

Scott, JM, Qualls, WA, Gaines, MK, Xue, RD, Doud, CW, White, GB. 2013. Efficacy of ground ULV application of Nyguard® Concentrate (10% priproxyfen) against *Aedes albopictus* larvae in St. Augustine, FL. TBFMCA 9:48-52.

Qualls, WA, Xue, RD, Beier, JC, Müller, GC. 2013. Survival of adult *Aedes albopictus* (Diptera: Culicidae) feeding on indoor ornamental plants with no inflorescence. *Parasitol Res* 112:2313-2318.

Revay, EE, Kline, DL, Xue, RD, Qualls, WA, Bernier, UR, Kravchenko, VD, Ghattas, N, Pstogy, I, Müller, GC. 2013. Reduction of mosquito biting-pressure: Spatial repellents or mosquito traps? A field comparison of seven commercially available products in Israel. *Acta Tropica* 127:63-68.

Xue, RD, Smith, ML, Qualls, WA. 2013. Field evaluation of truck-mounted thermal fog of DUET™ and Aqualuer® using different solvents against *Aedes albopictus*. JAMCA 29:301-303.

Samson, DM, Qualls, WA, Roque, D, Naranjo, DP, Alimi, T, Arheart, KL, Muller, GC, Beier JC, Xue, RD. 2013. Resting and energy reserves of *Aedes albopictus* collected in common landscaping vegetation in St. Augustine, Florida. JAMCA 29:231-236.

Xue, RD, Muller, GC, Qualls, WA, Smith, ML, Scott, JM, Lear, J, Cope, SE. 2013. Attractive target sugar baits: Field evaluation and potential for use in mosquito control, *Wing Beats* 24:13-18.

Khallaayoune, K, Qualls, WA, Revay, EE, Allan, SA, Arheart, KL, Kravchenko, VD, Xue, RD, Schlein, Y, Beier, JC, Muller, GC. 2013. Attractive toxic sugar baits: control of mosquitoes with the low-risk active ingredient Dinotefuram and potential impacts on non-target organisms in Morocco. *Environ. Entomol.* 42:1040-1045.

Guo, XX, Zhu, XJ, Li, CX, Dong, YD, Zhang, MY, Xing, D, Xue, RD, Qin, CF, Zhao, TY. 2013. Vector competence of *Aedes albopictus* and *Aedes aegypti* (Diptera: Culicidae) for DEN2-43 and New Guinea C virus strains of dengue 2 virus. *Acta Tropica* 128:566-570.

Weaver, JH, Phillips, JD, Gaines, MK, Xue, RD, Bequette, JM. An analysis of Anastasia Mosquito Control District's service requests over the past 8 years. *Wing Beats* 24:34-39.





## ANNUAL PROGRAM REPORT COMMITTEE MEMBERS

Member,  
Richard Weaver, Data Manager



Member,  
Marcia Kay Gaines,  
Base Station Supervisor



Member,  
Alice Fulcher,  
Biologist



Member, Jodi Scott,  
Education Specialist



**CHAIR,**  
**Dr. Rui-de Xue, Director**



Member,  
Charolette M. Hall,  
Administrative Assistant



### IN APPRECIATION

We would like to thank all residents of St. Johns County for their support, as well as the AMCD Board of Commissioners, the District's attorney and CPA, all employees, and all contractors, cooperative organizations, and agencies for their help in 2013.