

# ANASTASIA MOSQUITO CONTROL DISTRICT



OF ST. JOHNS COUNTY

## 2018 ANNUAL PROGRAM REPORT



**Screened  
Enclosures**



**Chicken Coops  
for Chicken  
Surveillance  
Program**



**Research Property Construction**

**Aerial View 1-17-19**



**Left: Gravid Traps**



**Right: AGO Traps**



**Bell 206B3 Helicopter for  
AMCD Aerial Capability  
July 12, 2018**

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## A MESSAGE FROM THE CHAIRPERSON



We have had a very successful year in mosquito control in 2018. The District purchased a surplus helicopter from the Lee County Mosquito Control District and we started to build our hangar to have our aerial program running in 2019. St. Johns County residents have been free of locally-acquired mosquito-borne diseases for the past 15 yrs. The District attracted & received approximately 300 thousand dollars in grants, materials, labor, and other funds to assist the District's programs. We kept a low millage rate and utilized our best efforts to control the mosquitoes and mosquito-borne diseases. Most of the phase II construction project has been almost completed and the Board approved the concept to build a Disease Vector Museum for promotion of public education and outreach. Mr. Don Girvan was appointed on December 7 to the Board to replace Jacqueline Rock, who resigned on December 2, 2018 and Commissioner Jeanne Moeller was re-elected. Mrs. Trish Becker was elected in November to replace Mrs. Catherine Brandhorst in January 2019. Thank you to our Board members, all of AMCD's employees, and all of St. Johns County's citizens for their support.

## A MESSAGE FROM THE DIRECTOR



In 2018 there were higher numbers of sentinel chickens (83) that tested positive for arbovirus in St. Johns County, compared with 2016 (1) and 2017(1). Also, we had two EEE horses and 1 pool of mosquitoes positive for WNV. AMCD received and provided 1,550 service requests. St. Johns County is continuing in 15 years without any locally acquired mosquito-borne diseases. AMCD, as a collaborator, received partial grants or equal value for labor or materials worth about \$300,000 from SpringStar/NIH, CDC, DACS, and other companies, to support our programs. AMCD collaborated with the USDA, FMCA's NE Regional Director, and the NE 1443 Regional Project Committee to successfully organize and hold the 15<sup>th</sup> annual workshop and attracted 180 registrants from outside of AMCD. AMCD provided the training and supported 8 intern students and 7 visiting scientists through different fund resources. Two employees received AMCA and FMCA awards & scholarships. I was elected as the Executive Director for the World Mosquito Control Association and successfully served the FMCA as the past President and served the Florida Entomology Society as President for the 2<sup>nd</sup> time. Even though I lost the election, I had been nominated to run for the AMCA Vice President election again. Thank you to our Board of Commissioners, all employees, all collaborators and related organizations and agencies for their cooperation and supporting our programs.





# ANASTASIA MOSQUITO CONTROL DISTRICT

## OF ST. JOHNS COUNTY

### BOARD OF COMMISSIONERS



Mr. Gary  
Howell  
Seat 5  
2013-2020



Mrs. Gina  
LeBlanc  
Seat 1  
2017-2020



Mrs. Catherine  
Brandhorst  
Seat 4  
2011-2018



Mrs. Jeanne  
Moeller  
Seat 2  
2007-2018



Mrs. Jacqueline  
Rock  
Seat 3  
2017-2018  
Resigned 12-2-18



Mr. Don Girvan  
Seat 3  
2018-2020  
Appointed 12-7-18  
through 12-30-20

### ANASTASIA MOSQUITO CONTROL DISTRICT APPOINTED OFFICERS



Mr. Wayne Flowers,  
Attorney, since: 11-9-10



Ms. Julieann Klein, CPA  
since: 9-11-03



Dr. Rui-De Xue, Director  
Hired: 4-14-03  
Director since: 2005



# AMCD FULL-TIME EMPLOYEES

4

## OPERATIONS CONTROL



Kyle Arber,  
Mosquito  
Control  
Technician  
Hired:  
5-01-17



Cathy Hendricks,  
Mosquito  
Control Tech.  
Hired:  
7-08-02



Patrick Kendrick,  
Mosquito  
Control Tech.  
Hired:  
4-07-03



Steven Smoleroff,  
Mosquito  
Control  
Technician  
Hired:  
10/2/17



Ricky Stockley,  
Mosquito  
Control Tech.  
Hired:  
2-04-13



Michael Vaughn,  
Mosquito  
Control Tech.  
Hired:  
3-03-14



Athan  
"Tom"  
Columbus,  
Supervisor  
Hired:  
2-6-17



Morgan  
Duett,  
Mosquito  
Control Tech.  
Hired:  
2-06-17



Jerry Iser,  
Mosquito  
Control Tech.  
Hired:  
2-02-15



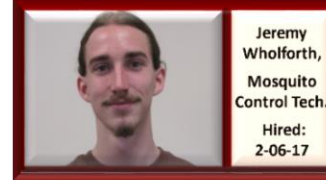
Barry Scott,  
Mosquito  
Control Tech.  
Hired:  
3-03-14



Steven  
Solana,  
Mosquito  
Control  
Technician  
Hired:  
4-24-00  
Resigned:  
1-4-19



David  
Strickland,  
Mosquito  
Control Tech.  
Hired:  
3-10-97

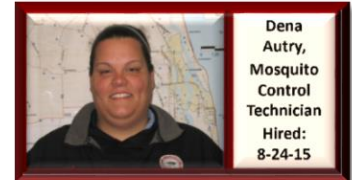


Jeremy  
Wholforth,  
Mosquito  
Control Tech.  
Hired:  
2-06-17

## SURVEILLANCE, ENTOMOLOGY, & EDUCATION



Dr. Daniel  
Dixon,  
Molecular  
Biologist  
Hired:  
2-16-16  
Resigned:  
1-03-19



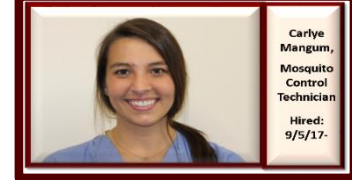
Dena  
Autry,  
Mosquito  
Control  
Technician  
Hired:  
8-24-15



Joseph  
D'Amato,  
Biological  
Technician  
Hired:  
4-18-16  
Resigned:  
10-26-18



Christopher  
Bibbs,  
Biologist  
Hired:  
6-02-14



Carlye  
Mangum,  
Mosquito  
Control  
Technician  
Hired:  
9/5/17



Molly  
Clark,  
Education  
Specialist  
Hired:  
2-06-17



## ADMINISTRATION



Rui-De Xue,  
Director  
(2005)  
Hired:  
4-14-03



Charolette  
M. Hall,  
Admin.  
Assistant  
Hired:  
11-05-07



Kay  
Gaines,  
Operations  
Manager  
Hired:  
8-07-00



Scott  
Hanna,  
Accountant  
Hired:  
7-03-07



Richard  
Weaver,  
Data  
Manager  
Hired:  
4-14-03



Peter  
Paul  
Leone,  
Pilot  
Hired:  
10-22-18

## MECHANICS



James Wynn,  
Mechanic  
Hired:  
3-04-96



John Freddie  
Allen,  
Mechanic  
Hired:  
7-08-02



## ~ ADMINISTRATION ~ PERSONNEL & RECOGNITIONS

**PERSONNEL:** Our voluntary visiting scientists: Mrs. Hui Liu, from Jiangsu Provincial CDC, from 5-2-18 through 7-30-18, Dr. Ding Zhu and Dr. Chao Shi, from Wuxi CDC, Jiangsu Province, China, from August 1<sup>st</sup> through October 26, 2018, Mrs. Kathy Shirley from Valley Ridge Academy Science Education from 6-4-18 through 7-10-18, Dr. Emad Khater from Ain Shams University in Cairo, Egypt from 9-4-18 through 11-7-18, and a visiting scientist from the University of Mexico join us as a Post Doctorate who worked with AMCD and UF, Dr. Hussein Sanchez Arroyo (8-1-18 to 7-31-19).

There were 8 seasonal interns in 2018: Morgan Smith (1-8-18 to 2-23-18), Lagan Mullin (5-1-18 to 8-17-18), Dillon Streuber (5-14-18 to 7-31-18), Courtney Cunningham (5-8-18 to 10-31-18), Catherine Chase (5-14-18 to 7-17-18), Parker Brown (5-15-18 to 06-26-18), Caroline Blunck (7-12-18 to 12-20-18) and Nicholas Acevedo (8-3-18 to 12-20-18).

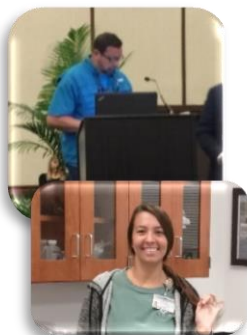
From May through October, we had 3 returning seasonal (6 mo.) inspector sprayers: Ray Gaulden (4<sup>th</sup> yr.), Phillip Vaughn (3<sup>rd</sup> yr.), and John Blalock (2<sup>nd</sup> yr.), also, 3 new inspector sprayers: Dazmond Hackney (5-1-18 to 10-31-18), Shannon Bentley (05-21-18 to 10-31-18) and Brenda Surratt-Robertson (5-1-18 to 6-25-18).

Mr. Joseph D'Amato, Biological Technician, resigned on 10-26-18 to advance his career in an environmental position with the Navy, Mr. Steven Solana, MC Technician will retire on 1-04-19 after eighteen and a half (18 ½) years of service with AMCD and Dr. Daniel Dixon will resign on January 3, 2019 after three years with AMCD to obtain a position with the USDA, and on October 22, 2018 AMCD hired a Pilot, Mr. Peter Paul Leone III.

### RECOGNITIONS AND AWARDS:



Christopher Bibbs, AMCD Biologist, received the AMCA 2<sup>nd</sup> Place Student Paper Competition Award at the AMCA annual meeting in in Kansas City, MO., February 26-27, 2018. He was also one of three students in Florida who received the Florida Entomological Society (July 2018) and the FMCA (Nov. 2018) Ph.D. Student Paper Award.



James Wynn, AMCD Mechanic, received the AMCA Boyd- Ariaz Grassroots Award for 2018 at the AMCA Annual Meeting in Kansas City, MO. February 26-27, 2018.

Carlye Tulley received a scholarship for the FMCA Dodd Short Course from the CDC Southeastern Center for Excellence in Vector borne diseases in January 2018.

The following AMCD personnel received awards for their years of service with the District: Mr. Patrick Kendrick, Mosquito Control Technician; Mr. Richard Weaver, Data Manager; and Dr. Rui-De Xue, Director; each for 15 years of service and dedication to the District and the Managements Choice Awards were presented to Richard Weaver and James Wynn with bonuses for all extra work this year and for their significant contributions and dedication to the District.

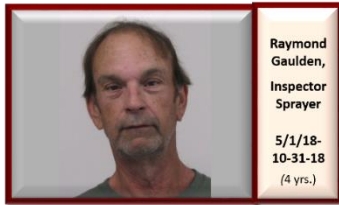




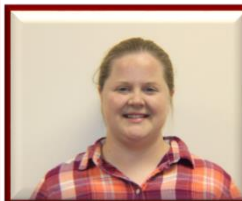
# 2018

## SEASONAL (6 MONTH) EMPLOYEES

6

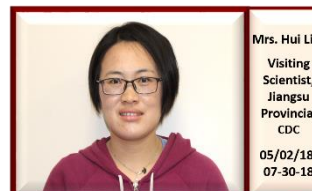
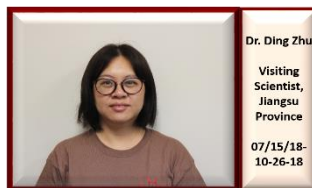


## INTERNS & VOLUNTEERS

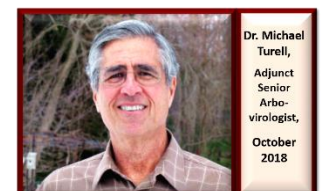


## VISITING

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## ADJUNCT PROFESSORS



## COMMITTEE MEMBERS 2018

### SAFETY COMMITTEE:

*Data Manager (Safety Coordinator):*  
Mr. Richard Weaver, (Chair)  
*Operations Manager:* Mrs. Marcia Kay Gaines  
*Supervisor:* Mr. Athan Tom Columbus  
*MC Technicians:* Mr. Ricky Stockley;  
Mr. John "Freddie" Allen,  
and Mr. Steven Solana

### APPLIED RESEARCH COMMITTEE:

*Commissioner:* Mrs. Jeanne Moeller  
(Chair)  
*Molecular Biologist:* Dr. Daniel Dixon  
*Data Manager:* Mr. Richard Weaver  
*Biological Tech.:* Mr. Joseph D'Amato  
*Biologist:* Mr. Christopher Bibbs  
*Education Specialist:* Ms. Molly Clark  
*MC Technician:* Ms. Dena Autry

### EDUCATION COMMITTEE:

*Commissioner:* Mrs. Jacqueline Rock,  
(Chair)  
*Biologist:* Mr. Christopher Bibbs  
*Education Specialist:* Ms. Molly Clark  
*Molecular Biologist:* Dr. Daniel Dixon  
*Operations Mgr.:* Mrs. Marcia Kay Gaines  
*Biological Tech.:* Mr. Joseph D'Amato  
*MC Technician:* Mr. Patrick Kendrick

### PLANNING COMMITTEE:

*Commissioner:* Mrs. Gina LeBlanc,  
(Chair)  
*Director:* Dr. Rui-De Xue  
*Biologist:* Mr. Christopher Bibbs  
*Operations Mgr.:* Mrs. Marcia Kay Gaines  
*Data Manager:* Mr. Richard Weaver  
*Supervisor:* Mr. Athan Tom Columbus

### FINANCIAL/AUDIT COMMITTEE:

*Commissioner:* Mrs. Catherine Brandhorst, (Chair)  
*Director:* Dr. Rui-De Xue  
*Accountant:* Mr. Scott Hanna  
*Data Manager:* Mr. Richard Weaver  
*Admin. Assist.:* Ms. Charolette M. Hall  
*Operations Mgr.:* Mrs. Marcia Kay Gaines

### EMERGENCY RESPONSE COMMITTEE:

*Operations Mgr.:* Mrs. Marcia Kay Gaines (Chair)  
*Supervisor:* Mr. Athan Tom Columbus  
*Data Manager:* Mr. Richard Weaver,  
*Biologist:* Mr. Christopher Bibbs  
*Admin. Assist.:* Ms. Charolette M. Hall  
*Education Specialist:* Ms. Molly Clark

### OPERATIONAL COMMITTEE:

#### GROUND/AERIAL

*Commissioner:* Mr. Gary Howell  
(Chair)  
*Director:* Dr. Rui-De Xue  
*Supervisor:* Mr. Athan Tom Columbus  
*Oper. Mgr.:* Mrs. Marcia Kay Gaines,  
*Data Manager:* Mr. Richard Weaver  
*Molecular Biologist:* Dr. Daniel Dixon  
*MC Technician:* Mr. David Strickland

### AERIAL COMMITTEE:

*Commissioner:* Mr. Gary Howell  
(Chair)  
*Director:* Dr. Rui-De Xue  
*Operations Mgr.:* Mrs. Marcia Kay Gaines  
*Data Manager:* Mr. Richard Weaver  
*Pilot:* Mr. Peter Paul Leone  
(Volusia MCD)  
*Pilot (Ret'd):* Mr. Brad Gunn  
(Beach MCD)

## AMCD MISSION, VALUES, VISION, and PROGRAMS

### OUR MISSION:

To protect all people from the nuisance of mosquitoes and mosquito-borne diseases in St. Johns County, Florida.

### OUR VALUES:

Service Driven, Scientific Based, Professional, Justified, Environmentally-friendly, Collaborative, Compassionate, Accountable, and Sustainable Excellence.

### OUR VISION:

AMCD of St. Johns County will be among the leading Districts for mosquito control and the people in St. Johns County will be among the healthiest in the nation – a well served community, enjoyed by all and supported by all partners.

### OUR PROGRAMS:

Customer Service, Operations (including Surveillance and Control), Education, and Applied Research.



In 2018 AMCD staff were located in the Base Station Complex at 120 EOC Drive. Harrell Construction Co., Inc. anticipates the completion of the construction of the eight acre south parcel and research property in March of 2019, which will increase the efficiency at AMCD.

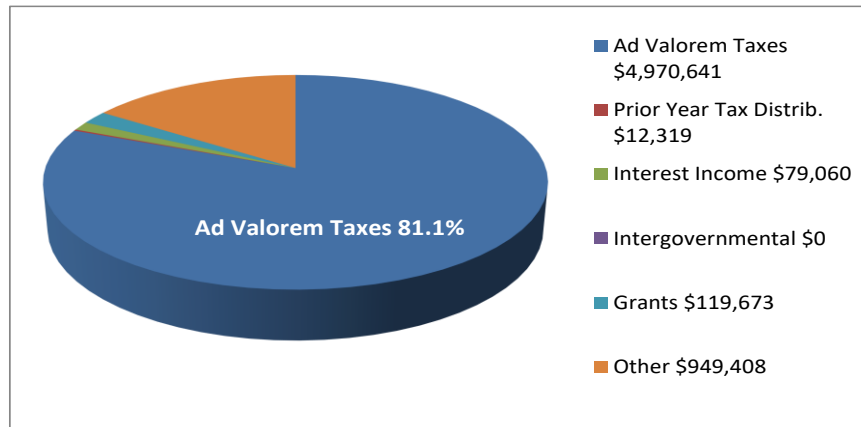
AMCD purchased a Bell 206B3 helicopter, after approval of the contract by the Board of Commissioners on July 12, 2018, from used surplus from the Lee County Mosquito Control District, for aerial capability for the citizens of St. Johns County.



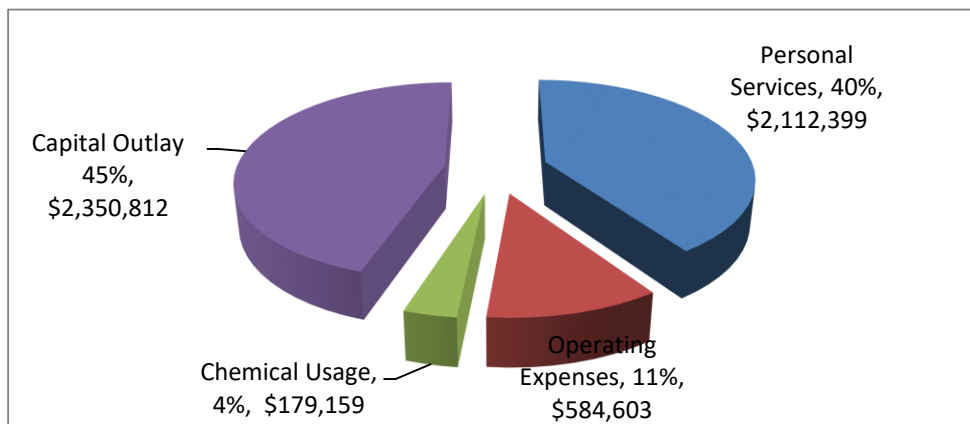
The North Station property, located at 10150 Cartwheel Bay Ave., St. Johns, FL 32259 was sold on March 15, 2018 to Blue Star Veterinary Hospital for \$650,000.00.

AMCD continues providing many services to the citizens of St. Johns County, including, but not limited to: conducting inspections; mosquito control; working with and conducting public education and assistance for local organizations, schools, homeowners associations, and the community in general – to help with surveillance and control of the populations of mosquitoes; to reduce the chance of human virus association and to protect the environment; conducting larviciding and adulticiding especially during the mosquito season from March through November; conducting applied research to test ideas and products to reduce the mosquito population; and providing employee training to keep up with modern technology to help in the control of mosquitoes and mosquito-borne diseases.

In the November 6, 2018 midterm elections; Mrs. Panagiota K. Trish Becker won seat 4, over incumbent Mrs. Catherine Brandhorst. Mrs. Becker's term will begin on Tuesday, January 8, 2019. After Mrs. Jacqueline Rock resigned her Seat 3 on December 2, 2018, the Commissioner of Agriculture, Mr. Adam Putnam appointed Mr. Don Girvan to Seat 3, beginning December 7, 2018 and he will serve the remainder of that term through December 31, 2020. Commissioner Jeanne Moeller, Seat 2, was re-elected in November for another 4 year term.

FINANCIAL SUMMARYFiscal Year - Oct. 1, 2017 through Sept. 30, 2018TOTAL DISTRICT REVENUES

Ad Valorem (real property) Current Year Taxes, the primary source of revenue, \$4,970,641, comprised of approximately 81.1% of the total Revenues of \$6,131,101. Grant Revenues, from Applied Research, Totaling \$119,673, shows continued growth. Miscellaneous Revenues, atypical in nature, comprised of \$650,000 for the sale of the District's Northwest sub-station (part of the consolidation process), and \$260,691 in FEMA reimbursements. The District's millage rate remained the same at 0.2150 for the second consecutive year through FY 17/18.

TOTAL DISTRICT EXPENDITURES\$5,226,973

Expenditures for the year were comparatively less than Revenues. The majority were attributed to Personal Services, 40%, and Capital Outlay, 45%, two thirds of which was used for continuation of Phase II of the District Facility Project to be completed in the following 18/19 Fiscal Year.



**BOARD BUSINESS:** AMCD staff provided many documents to Board members and the attorney for Board and Committee meetings in 2018 and supported 12 Board meetings, including the annual First and Final Public Hearings in September for the fiscal year budget and millage. The Service Request Phone App was made available this year to all smart device users in the public for free from the Google Play Store and Apple Apps Store, through GeoMosquito (MGIS). Commissioner Jacqueline Rock informed the Board in May, 2018 that she was resigning her Seat 3 to run for the City of St. Augustine Mayor. Her resignation became effective December 2, 2018. Agricultural Commissioner, Adam Putnam appointed Mr. Don Girvan to Seat 3, effective December 7, 2018 through the rest of the term, December 30, 2020.

**INVENTORY:** The annual physical inventory, monthly tire inventory, and chemical inventory were done regularly. One vehicle was approved for surplus, along with various equipment and other items April 12, 2018.

**DACS INSPECTION:** The Dept. of Agriculture and Consumer Services conducts a “Mosquito Control Pesticide Use Inspection” every 2 years: AMCD’s Inspection that was done in 2015 and 2017 reflected no deficiencies. It is due again in 2019.

**CONTRACTS:** After approval from the Board, many annual contracts were renewed for 2018 or sent out for bid, RFP, or by utilizing the state contracts to assure the District was obtaining the best services at the best possible prices. Some of these included, but were not limited to, the Auditor Contract in May 2018 (continually from 2003) with Julieann Klein from Lombardo, Spradley & Klein; Application Dynamics for small area aerial spraying and with VDCI for large areas adulticiding for 2018; The Board approved; the purchase of a helicopter in May 2018 and the contract for it in July 2018 and the Cintas Uniform contract was approved at the September 13, 2018 Board meeting; AV Fuel Corp. contract for purchase of Jet-A Fuel was approved Oct. 18, 2018 and a contract was approved with St. Johns County Aug. 30, 2018, to rent their hangar to temporarily house the helicopter; Resolution 2018-01 for the 2018 Elections was approved February 15, 2018, as was Resolutions 2018-02 for the millage rate (0.2200) and 2018-03 for the Budget on September 27, 2018 at the Final Public Hearing.

**INSURANCE:** The Board renewed the dental, life, and health, as well as fleet and Worker’s Compensation insurances at the December 13, 2018 Board meeting, again with little differences from the last couple of years; the annual renewals of the Tank Liability Insurance, Fleet Liability and Workers Compensation Ins. at the Sept. 13, 2018 Board meeting, Aviation Hull and Liability Insurance was approved Oct. 12, 2018.

**POLICIES:** The Board approved the updated version of the Commissioner’s Handbook on April 12, 2018 and staff continued updating the District’s Policy Manual and Employee Handbook in 2018 as policies were changed or added

### AMCD WEBSITE:

The AMCD's website: [www.amcdsjc.org](http://www.amcdsjc.org) continued to provide helpful, important information, such as: important links, public notices, meeting dates, along with, illness advisories, training and workshop information, mosquito biology, as well as document access, public education and employment opportunities, & much more. AMCD is also active on Facebook and Twitter and hosts an online survey to determine customer satisfaction.

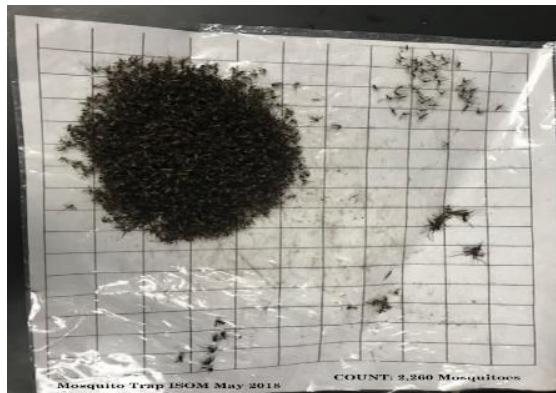
During 2018, AMCD continued utilizing the GeoMosquito database computer software program through the website for customer service requests and fogging and now in 2018, GeoMosquito released the free AMCD Phone App for the St. Johns County citizens to now use their Android or I-Phone and smart devices to enter service requests and/or check fogging and service request information via their smart phones and tablets.

We frequently updated our website in 2018 to enable our St. Johns County residents to be informed and to check to see if their address was scheduled for fogging and to enter service requests.



AMCD continues to follow Florida Statutes, Chapter 388, 5E-13, DACS's, EPA labels and Safety Data Sheets, and the District's policies and procedures while providing necessary inspections, adulticiding and larviciding.

AMCD answered 1,567 service requests in 2018 from local residents by phone, online through our website, by e-mail, fax, and walk-ins.



AMCD held an Open House on May 24, 2018 which was open to all the citizens of St. Johns County. Many were invited, including the Bee Keepers Association, Master Gardeners, the aerial committee members and pilots, as well as, the citizens of St. Johns County who were interested in what we do and who we are. We also had a Media Information Open House on June 26<sup>th</sup> during National Mosquito Control Awareness week, to get information out on EEE advisory's in St. Johns County.

AMCD continued to provide service and to educate residents on adult mosquitoes, larvae, adulticiding and larviciding. Staff also dispensed valuable information pertaining to pesticide safety, identification of mosquitoes & other insects, mosquito prevention and pesticide applications, and personal protection methods, as well as commercial mosquito traps, repellents and insecticides, assisting residents with concerns about no treatment areas, such as, bee-keepers properties or personal conditions that warrant no treatment.

Staff also assisted the public by distributing *Gambusia*, the mosquito larvae eating fish.

The Anastasia Mosquito Control District of St. Johns County works in cooperation with a number of related local, state, federal agencies, even international, private and commercial organizations, and members of the medical community. Those listed below briefly describe the work associations with AMCD in 2018 to prevent and control vector-borne diseases in Florida.

#### INTERNATIONAL COOPERATION AND ACTIVITIES:

Continue collaboration with Dr. Gunter Muller, the Hebrew University of Jerusalem, Israel and University of Bamako, Mali on attractive toxic sugar baits and ecology of vector mosquitoes.

Continue collaboration with the Western LLC, Israel, on attractive toxic sugar baits and bait station.

AMCD hosted international visitors: Dr. Emad Khater from Saudi Arabia for 2 months, Dr. Hui Liu from Jiangsu CDC, Dr. Zhu Ding, and Dr. Shi Chao from Wuxi CDC, China for 3 months, and Mr. Chun-Hua Shen, CEO, and Mr. Alan Zhang, World Sale Manager of LongRay, China, and Mr. Brian Liang, Manager, American LongRay for visiting.



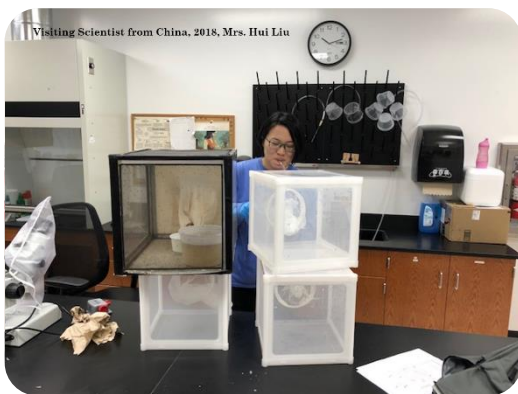
Collaborated with Dr. Tong-yan Zhao to organize the 6<sup>th</sup> International Forum for Surveillance and Control of Mosquitoes and vector-borne Diseases, Xiamen, China, May 26-30, 2019.

Dr. Xue attended the RB's Vector Control Group meeting in Geneva in early Feb, 2018.

Dr. Xue attended the Asian Vector Control meeting in Beijing, late March 2018.

Dr. Xue visited Jeddah City, Saudi Arabia for dengue vector control consulting in late April, 2018.

Mr. Chris Bibbs gave the panel lecture about vaporizing insecticide at the Australia Mosquito Control Association in early September, 2018



Dr. Xue visited and gave lectures at Jiangsu Provincial CDC, Zhangjiang International Travel Health Center, Beijing Institute of Microbiology and Epidemiology, China, October, 2018.

Dr. Xue attended and gave presentation at the 7<sup>th</sup> International Forum for sustainable management of disease vectors, Ningbo, China, October 22-24, 2018 and gave talking about *Aedes* vector control new technology at the 2<sup>nd</sup> Congress of the World Life Sciences, Beijing, China, October 27, 2018.

Ms. Molly Clark visited/gave a lecture about AMCD's education and outreach at Wuxi CDC and Jiangsu CDC in China.

Mr. Chris Bibbs gave the invited presentation and student paper at the ESA annual meeting, Vancouver, Canada, middle of November 2018.

AMCD signed MOUs about exchanging visitors, training, and applied research with Wuxi CDC, Zhejiang International Travel Health Center, and Dallah, Saudi Arabia



### NATIONAL AND FEDERAL AGENCIES & ASSOCIATIONS:

Collaborated with the USDA/CMAVE to continue organizing the annual workshop and evaluation of traps & repellents, and Stern Insect Technology for control of *Aedes aegypti*.

Continued to collaborate with NECE, Jacksonville, FL to evaluate spray influencing factors and ovitraps.



Continued collaborating with the NE 1443 project committee to organize the annual workshop.



AMCD is a sustaining member of the AMCA and AMCA/EPA's PESP member and provided the annual report. AMCD provided training for 12 people from CDC system in May, 2018. AMCD provided a booth on equipment and gave a presentation about vector control response at the Vector Control Workshop organized by the NACCHO in Orlando, middle of March 2018. Dr. Xue organized bridging the gap between research and operation symposium for the AMCA annual meeting, Kansas City, February 2018.

Dr. Xue continues to serve the SOVE Board. Commissioner Mrs. Moeller and Dr. Xue attended the SOVE 48<sup>th</sup> Annual meeting in California. Dr. Xue reviewed numerous numbers of manuscripts for the Entomological Society of American's Journals, AMCA's JAMCA, SOVE's JVE, Acta Tropica, PLoS One, and Environmental Health. Mr. Bibbs attended the ESA annual meeting and Tropical Medicine and Hyg annual meeting.

### STATE AGENCIES AND SERVICES:

The FMCA: Dr. Xue, as Past President, and Commissioner Jeanne Moeller, as a Board member, served the FMCA in 2018. Five commissioners and 11 employees attended the FMCA Dodd Short Courses, two commissioners and 2 staff members attended the FMCA Tallahassee Legislation meeting. Two Commissioners and Dr. Xue attended the AMCA's DC legislation meeting in May. Four staff members attended the FMCA Biologist/Entomologist workshop. Mr. Weaver, as an FMCA financial committee member, attended the FMCA financial meeting. Two commissioners and 9 employees attended the FMCA annual meeting and gave 8 presentations.

The Florida Entomology Society (FES): Dr. Xue was the President of the FES for 2<sup>nd</sup> year and AMCD host the 101st annual meeting, St. Augustine, FL, July 22-25, 2018.. Dr. Xue organized a vector control response symposium. One commissioner and seven staff attended the meeting. Dr. Xue gave the Presidential address and Mr. Bibbs and Dr. Xue gave two presentations at the symposium and student competition. Mr. Bibbs continued to serve the FES Board as a student representative.



STATE AGENCIES AND SERVICES: (Cont'd)

The District renewed the contract with the FDACS and arthropod control agreement with the DEP and State Parks. Dr. Xue continued to serve the FCCMC Research Review Committee to review 19 grant applications.

The District collaborated with the State and St. Johns County DOH to respond to suspected imported cases in St. Johns County in 2018 and released news for a mosquito-borne illness advisory. Dr. Xue, as a council member, continued to serve the County's health leadership.

COMPANIES AND OTHER DISTRICTS:

AMCD continued to cooperate with: Central Life Sciences to evaluate larvicides, MGK to evaluate new formulations of adulticides, spatial repellents & resistance, American LongRay for a novel rotated trap testing, SpringStar for AGO trap large deployment in St. Augustine, MosquitoMate for release of Wolbachia infected male mosquitoes in St. Augustine, several other companies for spatial repellents and trap testing, and Gainesville Mosquito Control for barrier spraying on honey bee impacts.



AGENCIES AND UNIVERSITIES:

AMCD cooperated with University of Florida Dr. Phil Kaufman to conduct vaporizing insecticide study and Ph.D. student training. Dr. Don Hahn for SIT study, Dr. Li-Ming Zhao for insecticide evaluation, Dr. R. Dinglasan for the CDC Southeastern Center for Excellence in Vector-borne Diseases' project and intern student training, and Phil Koehler for non-target impacts.

University of Miami, Dr. Xue as a Voluntary Professor for the school of Medicine continues to cooperate with Dr. John Beier for ATSB and biology and control of mosquitoes.

University of Kentucky, Dr. Xue and Dr. D. Dixon cooperated with Dr. Steven Dobson about MosquitoMate for control of *Aedes aegypti*

University of New Mexico. Dr. Xue and Dr. Dixon cooperated with Dr. John Xu for *Aedes aegypti* collection for Wabochia isolation.



MOSQUITO-BORNE DISEASES:

AMCD cooperates with the Florida Department of Health (DOH) to monitor imported mosquito-borne diseases. St. Johns County was under a mosquito-borne illness advisory, due to many sentinel chickens testing positive for West Nile Virus (WNV) and Eastern Equine Encephalitis Virus (EEE).

AMCD monitored WNV, EEE, Saint Louis Encephalitis Virus (SLE), Highland James Virus (HJV) and California Group Virus, using 10 sentinel chicken sites around St. Johns County. AMCD personnel bled chickens every Monday, from April 4<sup>th</sup> to December 17<sup>th</sup> and sent the blood samples to DOH's Arbovirus Laboratory in Tampa for testing.

In 2018, a total of 84 sentinel chickens tested positive for arboviruses, 39 for EEE and 44 for WNV, 1 for HJV, and 2 horses for EEE. In addition to sentinel chickens, mosquito pools were also tested this year. Pools were sent to two locations: the DOH's Arbovirus Laboratory in Tampa for WNV, EEE, and SLE testing and the Bronson Animal Disease Diagnostics Laboratory (BADDL) for Dengue, Chikun-gunya, and Zika Virus testing. 151 mosquito pools were submitted this year (139 to DOH Tampa Lab, 12 to BADDL), and only 1 was positive for WNV. In 2018, there were no locally acquired human cases of mosquito-borne diseases in St. Johns County.

MOSQUITO POPULATION:

The adult mosquito population was monitored by 32 CDC light traps baited with Octenol from April to November, 2018 and a total of 42,061 mosquitoes (27 species) were collected. Twelve (12) BG traps, baited with BG Lure and CO<sub>2</sub>, were used for *Aedes albopictus* and *Aedes aegypti* for a total of 13,879 mosquitoes collected from January to December, 2018. A total of 55,940 mosquitoes were trapped by both methods.

Larvae surveys were conducted on a daily basis by dipping flooded areas as needed. A total of 44,388 dips were conducted and 3,851 dips were positive with 29,793 larvae found.

ENVIRONMENTAL PARAMETERS:

Rainfalls were monitored by 32 rain gauges once a week.



## LARVICIDES AND LARVICIDING:

In 2018, the District primarily used Bti to kill mosquito larvae, as well as methoprene products in areas where BTI was not applicable.

Mosquito Control Technicians and Inspector/sprayers treated 1,982 times on a total of 10,785.9 acres for larval control.



## ADULTICIDES AND ADULTICIDING:

Mosquito Control Technicians and Inspector/Sprayers continued to use Aqualure 20-20 (Permethrin) and Mosquitomist Two for ground ULV spraying and treated 292 times on a total of 223,666.8 acres for adult mosquito control. DUET was used for hand thermal fogging for service requests and other areas 119 times on a total of 6,236.91 acres. Talstar P was used for barrier treatments in parks, special areas and for service requests 409 times for a total of 132.75 acres for adult mosquito control. Most of this was conducted for mosquito populations and control of the Zika vector.



## **Larvicides and Adulticides Used in 2018**

Larvicide	Amount Used		Area Treated		Times Applied
Altosid WSP	13901	ea	43.06	acre	302
Altosid XR	928	ea	2.14	acre	94
Altosid XRG	4689	lb	781.53	acre	122
Aquabac XT	76630	fl oz	9578.75	acre	964
B.t.i. Briquets	3671	ea	8.42	acre	181
Cocobear	10532	fl oz	27.41	acre	213
Natular DT	611	ea	0.09	acre	55
Natular XRT	73	ea	0.16	acre	4
Sustain MBG	2583	lb	344.35	acre	47
ADULTICIDES	AMOUNT USED		AREA TREATED		TIMES APPLIED
Aqualure 20-20 1:5	41134.3	fl.oz.	159229	acres	226
Duet 50%	9792	fl.oz.	6236.91	acres	119
Mosquitomist Two	42529	fl.oz.	64437.8	acres	66
Talstar P	44.74	gal.	132.75	acres	409

## SOURCE REDUCTION & BIOLOGICAL CONTROL:

A total of 423 used tires were collected and removed through-out the year by AMCD staff and personnel, for source reduction.

AMCD provided the public with the mosquito larvae eating fish (named: (Gambusia), for use in retention ponds and ditches, placing 578 fish.



Also, containers in and around residential yards, were emptied numerous times when

AMCD staff and personnel performed their inspections.

AUTOCIDAL GRAVID OVITRAP (AGO) MASS DEPLOYMENT:

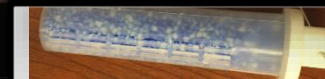
The Autocidal Gravid Ovitrap (AGO) is a non-chemical, lethal mosquito oviposition trap for use in residential settings. Last year, these traps were tested in a collaboration with AMCD and Springstar, the manufacturing company providing the traps, to launch over 550 traps across three neighborhoods for a combination of surveillance and control of domestic mosquitoes in St. Johns County. This year, AMCD expanded and repeated this study to assess over 1700 of these traps in downtown Saint Augustine and Saint Augustine South. The operations team, surveillance team, interns, and visiting scientists of AMCD all worked together to deploy, maintain, and keep records on these traps until the end of the season. The public was positive about the effort, and many residents not only supported the project, but firmly believe the traps to be a beneficial addition to their areas. Funding for this was by a sub-award from NIH/ SpringStar, Inc.

OPTIMIZATION OF AUTOCIDAL GRAVID OVITRAPS:

AGO traps were shown to be effective in an urban setting in Puerto Rico, resulting in an 80% reduction of mosquitoes in the area where they were mass deployed. These traps passively target gravid mosquitoes through the use of infusion water and visual color stimuli (i.e. a black bucket). Considering mosquitoes that are actively searching for a blood-meal are the most pestiferous to Saint Johns County residents, AMCD tested methods to attract host-seeking mosquitoes to AGO traps in a cost-effective long-lasting manner.

To test this, AMCD's visiting scientists Hui Liu, Shi Chiao, and Zhu Ding used BG lure, octenol, and carbon dioxide (dry ice) as supplemental attractants for the AGO traps. AMCD determined that BG lure and CO<sub>2</sub> were the most effective lures when used with an AGO trap. AMCD also tested if the incorporation of a suction fan enhanced the effectiveness of AGO traps. The field test still needs to be continued.

One of the issues associated with AGO traps is they capture a lot of non-target organisms (flies, moths, beetles, ants, etc.), and some of these organisms may be beneficial. Consequently, an AMCD intern, Lagan Mullis, sought to test different infusion waters compared to tap water to find one that is less attractive to non-target organisms but still captures mosquitoes. Lagan determined that tap water and orchard grass infusion collected the lowest number of non-targets while still collecting mosquitoes.





## CHAPTER 7 ~ APPLIED RESEARCH (CONT'D)

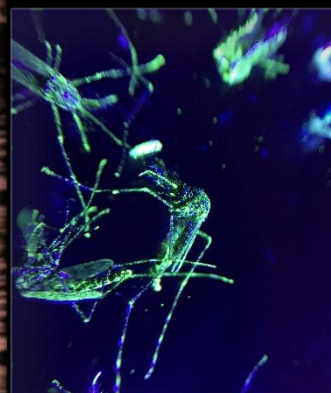
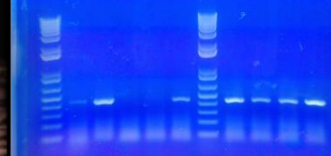
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### EVALUATION OF MOSQUITOMATE'S WOLBACHIA-INFECTED MOSQUITOES FOR *Aedes albopictus* CONTROL:

Similar to the AGO trap, there are other tools that take advantage of mosquito behavior. One of those tools is the Incompatible Insect Technique (IIT). IIT utilizes a process wherein male mosquitoes infected with a bacteria called Wolbachia are not compatible to produce offspring after mating with females. Considering mosquitoes mate only once, this represents a new avenue of non-chemical control against adult mosquitoes. This process has been used successfully in Miami, FL and was tested this year in the West King Street area of Saint Augustine. In collaboration with MosquitoMate, interns Catherine Chase and Caroline Blunck tested if Wolbachia-infected *Aedes albopictus* could reduce the native *Ae. albopictus* population. 120,000 of MosquitoMate's ZAP mosquitoes were released every week for the trial period from April until Late September. Populations were monitored weekly with BG traps in treatment and control areas throughout the study. Preliminary results suggested that the releases were successful and resulted in a reduction of the *Ae. albopictus* population. This was funded by a sub-award from MosquitoMate/CDC

### EVALUATION OF IRRADIATED MOSQUITOES FOR STERILE INSECT TECHNIQUE AGAINST *Aedes aegypti*:

Sterile insect technique (SIT) has been used for nearly a century to control noxious fly pests. In the early age of SIT, male flies were irradiated to make them unable to reproduce in the wild, which ruined female reproduction because of the female habit of being monogamous to their male mate. In collaboration with the USDA/CMAVE & UF, this technology was resurfaced for *Aedes aegypti* management where it has been shown that pesticide resistance prevents effective control. With the help of interns Courtney Cunningham and Parker Brown, locally acquired St. Augustine strain *Ae. aegypti* were sterilized with radiation, reared to adulthood, and then brought to *Ae. aegypti* infested areas of St. Johns county for weekly releases in an effort to determine flight ranges of the irradiated males, and resultant population reduction in the local area. After releases starting in April and extended through November, it was found that every area that received irradiated male *Ae. aegypti* returned a 100% reduction in viable field eggs within 1-2 weeks. Furthermore, fluorescent marked males were found to travel as much as 1,700ft away from their release point. When comparing populations to untreated areas, the SIT releases appear to have reduced the *Ae. aegypti* in test areas by 80% or more.



### NON-TARGET IMPACT VALIDATION WITH OPERATIONAL MOSQUITO ADULTICIDES:

When managing outbreaks of mosquitoes, we must be considerate of non-target organisms that may be caught up in the operation. Overwhelmingly, honey bees are a recurring risk when trying to avoid environmental impact. To better understand how our operationally used adulticides may affect honey bees, visiting scientist Dr. Hussein Sanchez-Arroyo is helping AMCD collaborate with the University of Florida to screen our products against both honey bees and mosquitoes to create a side-by-side comparison of sensitivity. This work has so far determined that honey bees require 3 times as much volume of insecticide to come into contact with them to observe the same signs of toxicity as in a mosquito. Even at the increased exposure volume, honey bees have anywhere from 2-6 times greater tolerance to the insecticides as the mosquitoes, and may even have as high as 83 times the tolerance to some mosquito control adulticides. This ongoing project is now evaluating field applied ultra-low volume sprays and outdoor residual (barrier) sprays to determine the likelihood of negative effects in the field. This was funded by a DACS grant to UF.

### NEW TRAPPING TECHNOLOGY: ADVANCEMENTS IN SURVEILLANCE AND USING TRAPS FOR MANAGEMENT:

Trap technology for mosquito management is rapidly developing. This year, visiting scientists Shi Chao & Zhu Ding evaluated a novel 12-jar rotator trap from American Longray. This trap nearly doubles the sampling resolution of the previously used John Hock rotator trap and improves the ability to detect fine intervals of mosquito activity throughout the day.

Light traps in general have many makes and models, some of which are designed for home use. Intern Nick Acevedo tested the Dyna Trap XL insect trap, which uses UV light and a proprietary lure for catching mosquitoes and other pests around the home. When compared to CDC light traps, the Dyna Trap was found to catch more *Ae. aegypti* and to perform comparably to the CDC light trap in the field against a mix of wild mosquitoes.

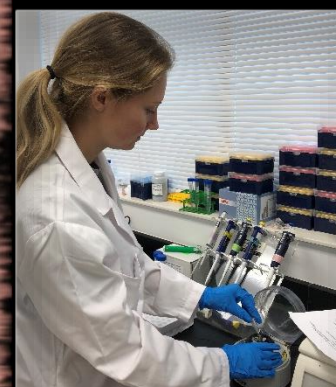
A third trap, the 00ZZZero, uses a combination of permethrin and pyriproxyfen on the interior of this mostly enclosed cast-molded polymer shell. When visiting scientist Dr. Emad Khater used it and modified it with a sheet of sticky paper in the field, the combined action of killing mosquitoes with permethrin and sticky paper, and then larvicide resulted in mean reduction of *Ae. aegypti* by 99.97 in a semi-field test.





## COLLABORATIVE , ONGOING, AND COMPLETED APPLIED RESEARCH PROJECTS FOR 2018

Sub-lethal effects of metofluthrin on resistant and field strains of <i>Ae. aegypti</i>	JennyPro bait station prototypes for ATSB field deployment in Elkton tire pile
Environmental aging assessment of formulated metofluthrin residual	Non-target impact validation with operational mosquito adulticides
Field efficacy of metofluthrin formulated for outdoor residual treatments	Trial efficacy of the 00ZZZero adulticidal and larvicidal mosquito trap
Synergy of formulated metofluthrin in multi-active ingredient outdoor residuals	Mosquito light trap comparisons with the all-purpose Dyna Trap for insect removal
Metofluthrin resistance ratio against <i>Ae. aegypti</i>	Evaluation of a novel 12-jar rotator trap from Longray
ULV proof-of-concept for FIFRA exempt NatureCide	AGO modification with host-baited lures
Blood feeding competence of irradiated female <i>Ae. aegypti</i>	AGO modification with DC-powered fan motor
<i>Aedes aegypti</i> oviposition preferences in common bromeliads containing variable water levels	AGO modification with alternative infusion cocktails and varied fermentation intervals
Naval Entomological Center of Excellence vertical drift assessment for truck-ULV	Assessment of AGO non-target collection from peridomestic environments
Screening for native <i>Wolbachia</i> presence in St. Johns County mosquitoes	Trial of the MosquitoMate ZAP, <i>Wolbachia</i> infected <i>Ae. albopictus</i>
Mark-release-recapture study of irradiated male <i>Ae. aegypti</i> in St. Augustine	Tolfenpyrad efficacy against pyrethroid resistant <i>Ae. aegypti</i>
Population reduction trial with irradiated male <i>Ae. aegypti</i> in St. Augustine	Novel ATSB trials with alternative insecticide classes for mosquito control
Novel infusion water mixtures for improving <i>Ae. aegypti</i> rgg surveillance	Comparative efficacy of the AGO versus the 00ZZZero trap for controlling <i>Ae. aegypti</i>

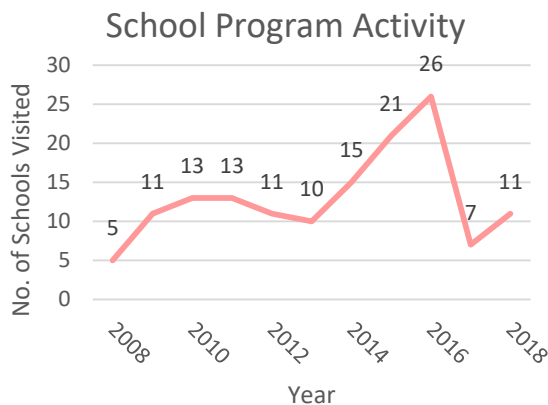




Group photo of the 12 CDC employees after participating in the field activities and completing the classroom case study led by Christopher Bibbs, CDC/AMCA Master Trainer, and Dr. Caroline Efstathion, FDACS regional Mosquito Control Representative.

#### COMMUNITY EVENTS/PUBLIC OUTREACH:

The AMCD was involved in 27 public outreach programs in 2018. District employees worked to inform citizens about the new service request app. The app has been downloaded 346 times since its release in April 2018. Much community outreach effort focused on the three large scale experiments being conducted by the research team this year. Neighborhood door campaigns were conducted for the AGO, SIT, and MosquitoMate projects. Despite the fact that Zika is no longer a common concern for the citizens of St. Johns County. AMCD continues to work with The St. Johns County Department of Health. The outreach program reached 14,013 people in 2018.



#### AMCA/CDC CROSS TRAINING EVENT:

In May 2018, AMCD was selected to assist with a CDC cross training event. Twelve representatives from the CDC's Division of Vector-Borne Diseases, Arboviral Diseases Branch, Entomology and Ecology Team were sent to Florida to train with NECE and AMCD. CDC representatives were paired with mosquito control technicians, interns, research staff, the surveillance team, as well as the data manager and the education specialist. The experiences, in combination with a classroom case study allowed the CDC's team to learn incident management from Dr. Caroline Efstathion, FDACS regional mosquito control specialist and IMT first responder, and Christopher Bibbs, CDC/AMCA Master Trainer and St. Johns County Department of Health IMT member.



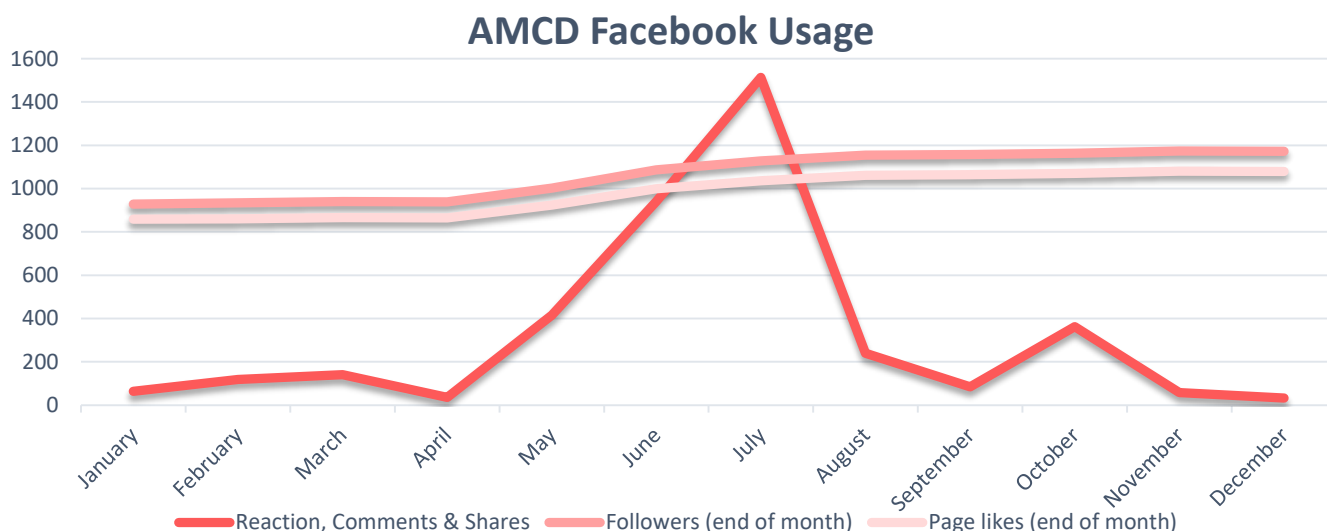
Paul Leone, Pilot, and Molly Clark, Education Specialist, at a Civil Air Patrol meeting to teach the cadets about helicopters, their use in mosquito control, and educate the cadets about general mosquito control and prevention.

#### ST. JOHNS COUNTY SCHOOL PROGRAMS:

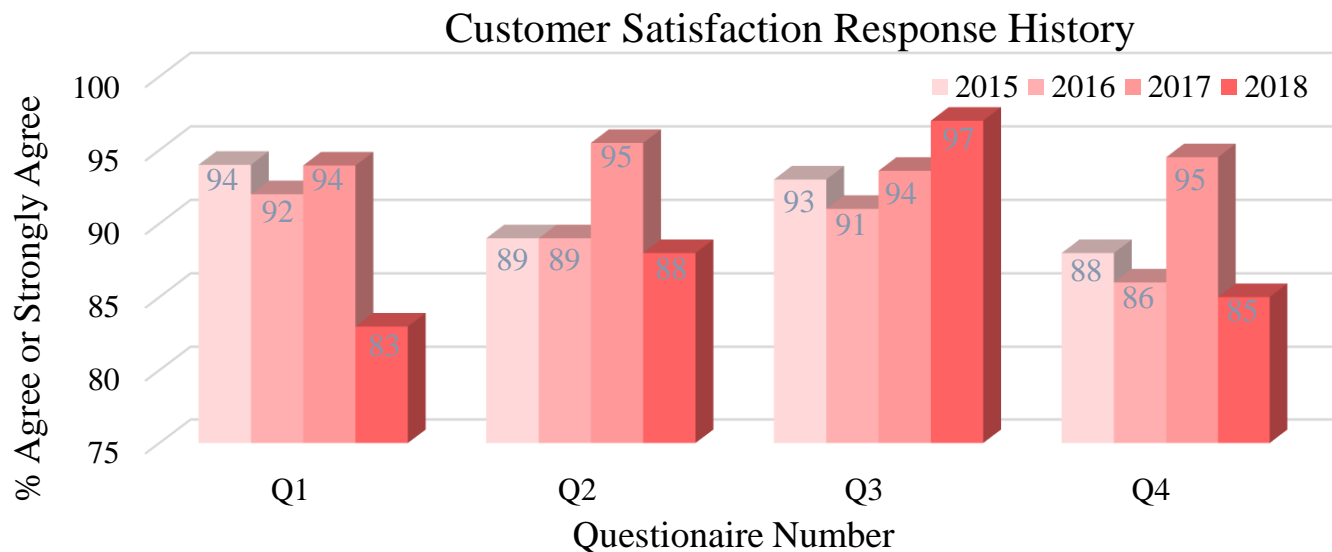
In 2018 the AMCD taught at 11 different schools in St. Johns County, reaching 1812 students across K-11th grade. Participating Elementary schools included: Crookshank, MK Rawlings, RB Hunt, Valley Ridge Academy, and Wards Creek Elementary Schools. Participating Middle Schools included Valley Ridge Academy and St. John's Academy. Participating High Schools included Ponte Vedra High, Creekside and St. Johns Technical. The District was once again asked to judge the St. Johns County STEM Fair and is currently on the advisory board for the Academy of Coastal and Water Management at St. Johns Technical High School and the Academy of Biotechnology and Medical Research at Ponte Vedra High School.



**PUBLIC RELATIONS:** The Districts continued to increase presence on social media in 2018. The Anastasia Mosquito Control District Facebook page now has over 1100 followers and 1000 page likes. We have continued to publish daily spray maps on Facebook, Twitter, and the District's website. Residents have reported checking our social media pages to see if we will be out in their neighborhood before embarking on evening activities outdoors. The District's social media following increased steadily throughout 2018 with substantial increases resulting from mosquito activity June through July.



**2018 CUSTOMER SATISFACTION SURVEY RESULTS:** AMCD continues to gauge customer satisfaction using both physical and internet surveys. For 2018 there were 56 physical surveys returned and 4 internet surveys returned, for a total of 60 returned surveys, many of which contained praise for the knowledgeability and professionalism of inspectors.



## 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.
2. AMCD staff is informative and professional.
3. AMCD responds to my service requests within the standard 1-2 business days.
4. I am aware of and actively participate in DRAIN and COVER methods.

Organized and attended by AMCD staff and commissioners:

- Jan 9-10: Dr. Xue & R. Weaver attended the FMCA Aerial Short Course, Ft. Myers, FL
- Jan 12: Dr. Xue attended UF/Dept. of Entomology & Nematology's seminar about malaria vaccine
- Jan 22-24: Ten employees & 5 Commissioners took different classes at the FMCA's Dodd Short Courses, Orlando, FL. Commissioner Moeller organized the course for the Commissioner's session
- Feb 5-9: Dr. Xue attended the RollBack Malaria Vector Control working group mtg., Geneva, Switzerland
- Feb 15: M. Smith attended the UF/EPI Research Day and presented a poster about activity patterns
- Feb 16: K. Gaines, R. Weaver, & Dr. Xue attended the UF/EPI Seminar about CDC's SECEVD & Career Day
- Feb 26-Mar 2: Dr. Dixon, C. Bibbs and Dr. Xue attended the AMCA annual meeting where Dr. Xue organized a symposium on bridging the gap between research and operations, Kansas City, MO
- Mar 13: D. Autry, M. Clark, & Dr. Xue attended the Vector Control Workshop organized by the NACCHO and AMCA. Dr. Xue taught at the workshop
- Mar 19: Dr. Xue, as President, organized & held the Florida Entomological Society Exec. Director mtg.
- Mar 20-22: AMCD organized and held the 15<sup>th</sup> annual workshop at AMCD, St. Augustine, FL
- Mar 26-29: Dr. Xue attended the Asian Vector Control meeting, funded by the I2I/IVCC, Beijing, China
- Apr 17: Three employees attended the 4<sup>th</sup> FMCA Biologist/Entomologist workshop where C. Bibbs taught
- Apr 21-27: Dr. Xue visited Jeddah for control of Dengue Fever vector and funded by Dallah.
- May 14-16: Commissioners' Moeller & Rock, and Dr. Xue attended the AMCA Legislation meeting, Washington DC
- May 17: AMCD hosted CDC's workshop and training and had 12 staff attend
- May 22: Dr. Xue attended the FCCMC research selection committee mtg., USDA/CMAVE, Gainesville, FL
- June 14: AMCD hosted and held the AMCD & DOH annual collaboration meeting
- June 25: AMCD held a seminar for intern student Parker Brown, on bromeliad plants & mosquito oviposition
- June 28: Commissioner Moeller and Dr. Xue attended the FMCA Board meeting, St. Petersburg, FL
- Jul 10: AMCD held a seminar for a visiting scientist about ULV spray of Naturcide against mosquitoes
- Jul 13: AMCD held a seminar for a Univ. of Miami intern student about Wolbachia-infected mosquitoes
- Jul 22: AMCD held the FES Board meeting, St. Augustine, FL
- Jul 23-25: Dr. Xue attended the FES annual meeting and gave the Presidential address, St. Augustine, FL
- Jul 24: AMCD held symposium "Biology & Control of Human Disease Vectors" at FES mtg., St. Aug., FL
- Jul 26: AMCD held a seminar for visiting scientist, Hui Liu about AGO & lures and an intern student about ATSB
- Aug 2: AMCD held a seminar for a Post doc. & visiting scientist, Dr. Hussein Sanchez-Arroyo on new traps
- Aug 17: AMCD held a seminar for intern student, Lagan Mullin about infusion & Ago traps
- Sep 3: C. Bibbs gave a plenary presentation at the Australia Mosquito Control Assoc., funded by their association, Australia
- Sep 20: Commissioner Moeller and Dr. Xue attended the DACS & FMCA legislation meeting in Apopka, FL
- Oct 7-11: Dr. Xue and Commissioner Moeller attended the SOVE annual meeting, Yosemite, CA
- Oct 12: Commissioner Moeller and Dr. Xue visited Consolidated Mosquito Control District, Fresno, CA
- Oct 18: AMCD held a seminar for 3 visiting scientists and one intern student
- Oct 22-24: Dr. Xue attended the 7<sup>th</sup> International Forum for Sustainable Management of Disease Vectors in Ningbo and organized, moderated, and gave a presentation at the symposium for new technology
- Oct 25: Dr. Xue attended & gave a lecture on mosquito-borne disease increase at the Zhejiang International Travel Health Center's Integrated Management of Disease Vector Workshop, Hangzhou, China
- Oct 27-28: Dr. Xue co-organized and moderated the vector control symposium for the 2<sup>nd</sup> World Life Science Congress, Beijing, China. The conference provided funding
- Oct 31: Dr. Xue and Molly Clark attended and taught at the Jiangsu Vector Control and Disinfection Association annual meeting, Nanjing, China
- Nov 4: Dr. Xue attended the FMCA Board meeting, St. Petersburg, FL
- Nov 5-7: Dr. Xue, along with 7 employees, 2 visiting scientists, and Commissioner LeBlanc attended the FMCA annual meeting
- Nov 12-14: C Bibbs attended the ESA annual meeting and gave 2 presentations, Vancouver, Canada

- Bibbs, C. S. and R. D. Xue.** Welding together a multi-stage workforce pipeline: a southeastern US dossier. Entomological Society of America Meeting; Training the Next Generation of Vector Biologists Symposium – November 14<sup>th</sup>, 2018.
- Bibbs, C. S., J. R. Bloomquist, D. A. Hahn, P. E. Kaufman, and R. D. Xue.** Gone in 60 seconds: impaired behavior and fecundity after exposing lab and field strains of *Aedes aegypti* to metofluthrin vapors. Entomological Society of America Mtg.; Student 10-minute Paper Competition – November 12<sup>th</sup>, 2018.
- Aldridge, R., J. Kline, S. Britch, C. S. Bibbs, M. E. Clark, D. Dixon, R. D. Xue, D. A. Hahn, and K. J. Linthicum.** Mark-release-recapture of irradiated male *Aedes aegypti* in northern Florida as part of a Sterile Insect Technique control program. Entomological Society of America Meeting; 10-minute Submitted Paper Symposium – November 12<sup>th</sup>, 2018.
- Shen, Y., R. D. Xue, and C. S. Bibbs.** Relative insecticidal efficacy of three spatial repellents against *Aedes aegypti*. Entomological Society of America Meeting – November 12<sup>th</sup>, 2018.
- Bibbs, C. S., J. R. Bloomquist, D. A. Hahn, P. E. Kaufman, & R. D. Xue.** Flying under the influence: Impaired fitness of susceptible, resistant, and field strains of *Aedes aegypti* after 60 second exposures to metofluthrin vapors. 90<sup>th</sup> Florida Mosquito Control Association Conference – November 7, 2018.
- Xue, R.D.** Seminar: Mosquitoes and plant relationship. Department of Vector Biology and Control. Beijing Institute of Microbiology and Epidemiology, Beijing, March 29, 2018.
- Xue, R.D.** Seminar: Dengue vector control technology. Department of Environmental Protection. Jeddah, Saudi Arabia, April 28, 2018.
- Aldridge, R., J. Kline, S. Britch, C. S. Bibbs, M. E. Clark, D. Dixon, R. D. Xue, D. A. Hahn, & K. J. Linthicum.** Mark-release-recapture of irradiated male *Aedes aegypti* in northern Florida as part of a Sterile Insect Technique control program. 90<sup>th</sup> Florida Mosquito Control Association Conference – November 6, 2018.
- Xue, R. D., D. Dixon, and C. S. Bibbs.** Resurgence of Zika Vector Mosquitoes *Aedes aegypti* (Diptera: Culicidae) and its Control Efforts at Anastasia Mosquito Control District, Northeastern Florida, USA. 7<sup>th</sup> International Forum for Sustainable Vector Management, Chinese Centers for Disease Control and Prevention, Ningbo, Zhejiang – October 22-24<sup>th</sup>, 2018.
- Xue, R.D.** Imported vector-borne diseases, Integrated Vector Management Workshop, Zhejiang International Travel Health Center, Hangzhou, China, October 25, 2018.
- Bibbs, C. S., P. E. Kaufman, J. R. Bloomquist, D. A. Hahn, and R. D. Xue.** Multi-modal toxicants: greater than the sum of repellency and mortality. 13<sup>th</sup> Annual Mosquito Control Association of Australia Conference; Invited Plenary Speaker for Novel Mosquito Control Technology – September 3<sup>rd</sup>, 2018.
- Bibbs, C. S., D. A. Hahn, P. E. Kaufman, and R. D. Xue.** Downstream biotic shifts in container-inhabiting mosquitoes after sub-lethal exposure to transfluthrin vapors. 101<sup>st</sup> Annual Florida Entomological Society Meeting; Student Competition – July 22<sup>nd</sup>, 2018.
- Bibbs, C. S., M. K. Gaines, D. Dixon, C. Efstathion.** Mosquito control operations and incident management team training workshop for CDC-ONDIEH-NCEZD-NCEH personnel. CDC/AMCA Florida Hub, Anastasia Mosquito Control District, Saint Augustine, FL – May 17<sup>th</sup>, 2018
- Bibbs, C. S., P. E. Kaufman, J. R. Bloomquist, D. A. Hahn, and R. D. Xue.** Acute toxic effects of spatial repellent pyrethroids and potential utility for mosquito management. 4<sup>th</sup> Annual Florida Mosquito Control Association DODD Entomologist/Biologist Workshop – April 17<sup>th</sup>, 2018
- Bibbs, C. S., D. A. Hahn, P. E. Kaufman, and R. D. Xue.** Can sub-lethal exposure to spatial repellents affect mosquito fecundity or oviposition behavior? 15<sup>th</sup> Annual Arbovirus Surveillance and Mosquito Control Workshop; Insecticides & Resistance Symposium – March 21<sup>st</sup>, 2018.
- Smith M. L., D. Dixon, C. S. Bibbs, D. Autry, and R. D. Xue.** From Dusk 'Till Dawn: Diel activity patterns of *Aedes aegypti* in St. Augustine, Florida. 15<sup>th</sup> Annual Arbovirus Surveillance and Mosquito Control Workshop; Disease Surveillance Symposium – March 20<sup>th</sup>, 2018



- Bibbs, C. S., D. A. Hahn, P. E. Kaufman, and R. D. Xue.** Can sub-lethal exposure to spatial repellents affect mosquito fecundity or oviposition behavior? 84<sup>th</sup> Annual American Mosquito Control Assoc. Conference – February 27<sup>th</sup>, 2018
- Smith, M. L., D. Dixon, C. S. Bibbs, D. Autry, and R. D. Xue.** Diel activity patterns of *Aedes aegypti* after resurgence in St. Augustine, Florida as collected by a mechanical rotator trap. Emerging Pathogens Institute Research Day 2018 – February 15<sup>th</sup>, 2018
- Gaines, M.K.** Mosquito population outbreak and control efforts after hurricane Irma in St. Johns County, Florida. 15<sup>th</sup> Annual Arbovirus Surveillance and Mosquito Control Workshop, March 20, 2018
- Autry, D.** Large-scale deployment of CDC/AGO traps for control of *Aedes* mosquitoes. 15<sup>th</sup> Annual Arbovirus Surveillance and Mosquito Control Workshop, March 21, 2018
- Dixon, D.** Field comparison of CDC's AGO traps & In2Care traps for control of *Aedes* mosquitoes in St. Augustine, FL. 15<sup>th</sup> Annual Arbovirus Surveillance and Mosquito Control Workshop, March 22, 2018
- Dixon, D., J. D'Amato, R.D. Xue.** Surveillance and control of *Aedes aegypti* and *Aedes albopictus* in St. Johns County, FL. 84<sup>th</sup> American Mosquito Control Association (AMCA) Annual Meeting, Kansas City, MO. Feb 26-March 2, 2018.
- Xue, R.D.** Collaboration and applied research benefit to Anastasia Mosquito Control Operation. 84<sup>th</sup> AMCA annual meeting, Kansas City, MO, Feb 26-March 2, 2018.
- Kuhns, E., S. Whiteside, D. Murdock, I. Unlu, R.D. Xue, D. Dixon, D. Ward, D. Wesson, and M. Banfield.** Evaluation of a commercialized AGO for control of *Aedes aegypti* and *Aedes albopictus* in three regions of the US. 84<sup>th</sup> AMCA annual meeting, Kansas City, MO, Feb 26-March 2, 2018.
- Xue, R.D.** Overview of the Asian SOVE. 48<sup>th</sup> Annual SOVE Conf., Yosemite, CA., October 7-11, 2018.
- Xue, R.D., H. Liu, D. Dixon, and D. Autry.** The CDC autocidal gravid ovitraps combined with attractants increase collection of *Aedes aegypti*. 48<sup>th</sup> Annual SOVE Conference, Yosemite, California, October 7-11, 2018.
- Xue, R.D.** Influence of three common aquatic plants on survival of *Anopheles quadrimaculatus* and ATSB efficacy against the adult mosquitoes. 13<sup>th</sup> RB Malaria Vector Control Work Group Meeting, Geneva, Feb 6, 2018.
- Xue, R.D.** Presidential address: why have the vector-borne diseases increased recently? 101<sup>th</sup> Florida Entomology Society Annual Meeting, St. Augustine, FL, July 24, 2018.
- Xue, R.D.** CDC's AGO incorporation with attractants for control of gravid and host-seeking *Aedes aegypti*. 90<sup>th</sup> Annual Meeting of the FMCA, St. Petersburg, FL, Nov 4-7, 2018.
- Xue, R.D.** New technology for vector *Aedes* mosquitoes control at St. Johns County, FL. 2<sup>nd</sup> World Life Science Conference, Beijing, China, October 27, 2018.
- Xue, R.D.** Seminar: What is next for mosquito-borne diseases?, Beijing Institute of Microbiology, Beijing, China, October 28, 2018.
- Xue, R.D.** AMCD vector control response, Jiangsu Conference of Vector Control and Anti-Infection Association, Jiangsu CDC, Nanjing, China, October 30, 2018.
- Clark, M.** Laboratory evaluation of two new active ingredients for ATSB against mosquitoes. 90<sup>th</sup> Annual Meeting of the FMCA, St. Petersburg, FL, Nov 4-7, 2018.
- Clark, M.** Seminar: Overview of AMCD's education and public relation program, Wuxi CDC, China, Oct. 27, 2018
- Clark, M.** AMCD outreach and education program, Jiangsu Conference of Vector Control and Anti-infection Association, Jiangsu CDC, Nanjing, October 30, 2018.
- Dixon, D.** Comparison of different infusions with AGO traps to collect mosquitoes and its impact on non-target organisms. 90<sup>th</sup> Annual Meeting of the FMCA, St. Petersburg, FL, Nov 4-7, 2018.
- Sanchez-Arroyo, H.** Laboratory bioassay of four adulticides against mosquitoes and its impact on honey bees. 90<sup>th</sup> Annual Meeting of the FMCA, St. Petersburg, FL, Nov 4-7, 2018.
- Weaver, R.** New application (mobile solution) for AMCD service requests. 90<sup>th</sup> Annual Meeting of the FMCA, St. Petersburg, FL, 2018.

**Bolded Names are AMCD Staff and Employees**

1. Ledesma, NA, Kaufman, PE, **Xue, RD**, Leyen, C, Macapagal, MJ, Winokur, OC, Harrington, LC. 2017. Entomological and socio-behavioral components of dog heartworm (*Dirofilaria immitis*) prevalence in two Florida Communities. Proceedings and Papers of the Mosquito and Vector Control Association of California 85:1—3.
2. Bibbs CS, Anderson CS, Smith ML, **Xue RD**. 2018. Direct and indirect efficacy of truck-mounted applications of s-methoprene against *Aedes albopictus* (Diptera: Culicidae). International Journal of Pest Management 64:19-26.
3. Farooq M, Gibson-Corrado, J, Knap, J, **Xue, RD**, Smith ML, Briley AK, Richardson A, Cilek J. 2018. Effect of travel speed on dispersion of Aqualuer 20-20 sprayed by truck-mounted ULV sprayer against caged *Aedes aegypti*. JAMCA 34:70-74.
4. **Blore K**, Beier JC, **Xue RD**. 2018. Impact of three species of aquatic plants on survival of *Anopheles quadrimaculatus* and its effect on the efficacy of boric acid sugar baits. JAMCA 34:50-52.
5. **Xue RD**, Lippi C, Drake L. 2018. Species composition of mosquitoes and invertebrates in common Bromeliad plant axils (Family: Bromeliaceae) and the plant impacts on survival of vector mosquito, *Aedes albopictus* (Diptera: Culicidae). China Tropic Medicine 18:6-10.
6. Smith ML, **Dixon D**, **Bibbs CS**, **Autry D**, **Xue RD**. 2018. Diel patterns of *Aedes aegypti* (Diptera: Culicidae) after resurgence in St. Augustine, Florida as collected by a mechanical rotator trap. J Vector Ecology 44:201-204.
7. **Bibbs CS**, Tsikolia M, Bernier UR, Bloomquist JR, **Xue RD**, Kaufman PE. 2018. Vapor toxicity of five volatile pyrethroids against *Aedes aegypti*, *Ae. albopictus*, *Culex quinquefasciatus*, and *Anopheles quadrimaculatus* (Diptera: Culicidae). Pest Management Science, 74:2699-2706. DOI: <https://dx.doi.org/10.1002/ps.5088>
8. **Bibbs CS**, Crosier JE, **D'Amato JM**, Gibson-Corrado J, **Xue, RD**. 2018. Bromeliad targeted foliar treatments with Aqualuer® 20-20 for hot spot mitigation using three hand sprayers against *Aedes albopictus* (Diptera: Culicidae). JVE 43:215-219.
9. **Bibbs CS**, Hahn DA, Kaufman PE, **Xue RD**. 2018. Sublethal effects of a vapor-active pyrethroid, transfluthrin, on *Aedes aegypti* and *Ae. albopictus* (Diptera: Culicidae) fecundity and oviposition behavior. Parasites & Vectors 11:486.
10. Zhu JW, Cermak SC, Kenar JA, Brewer G, Haynes KF, Boxier D, Baker PD, Wang DS, Wang CL, Li AY, **Xue RD**, **Shen Y**, **Wang F**, Agramonte NM, Brenier UR, de Oliveira Filho JG, Borges LMF, Friesen K, Taylor DB. 2018. Better than DEET repellent compounds derived from Coconut oil. Scientific Reports 8:14053.
11. Kline, DL, Muller, GC, Junnila, A, **Xue, RD**. 2018. Chapter 5. Attractive toxic sugar baits (ATSB): a novel vector management tool. Advances in the Biorational Control of Medical and Veterinary Pests, ed. By Norris et al. ACS symposium Series, American Chemical Society, Washington , DC, 2018. P. 63-73.
12. **Bibbs CS**, Kaufman PE, Bloomquist JR, Hahn DA, **Xue, RD**. 2018. Breathe deep, get excited, taking care of some mosquitoes. Mosquito Bites 13(1):8-11.

# ANNUAL PROGRAM REPORT

## COMMITTEE MEMBERS



Clockwise from Bottom Left: Mr. Christopher Bibbs (Biologist), Mr. Athan Tom Columbus (Supervisor), Dr. Daniel Dixon (Molecular Biologist), Mr. Richard Weaver (Data Manager), Mrs. Marcia Kay Gaines (Operations Manager), Ms. Charolette M. Hall (Administrative Assistant), Mr. Joseph D'Amato (Biological Technician), Mrs. Dena Autry (Mosquito Control Technician -Surveillance), Ms. Molly Clark (Education Specialist), Mr. Scott Hanna (Accountant)

### IN APPRECIATION



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