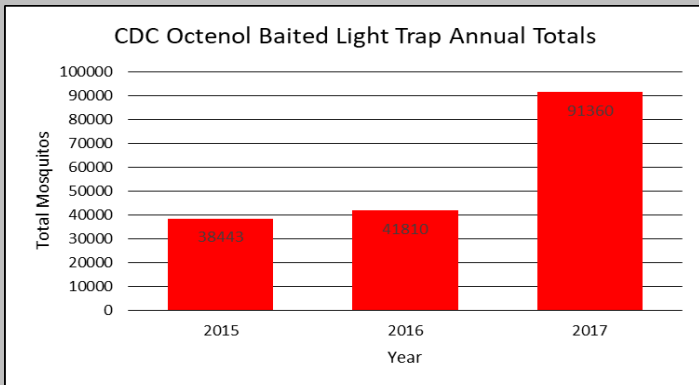
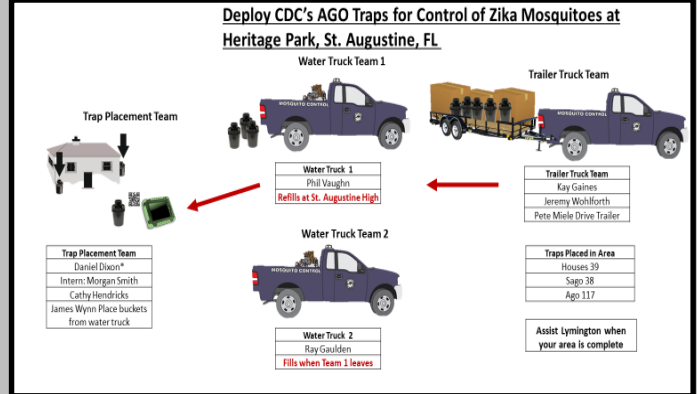
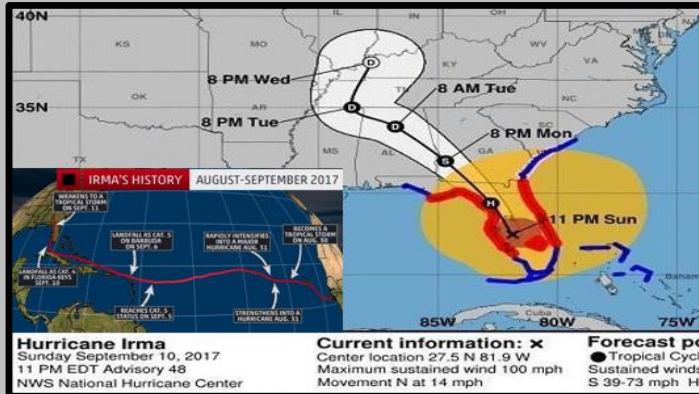


ANASTASIA MOSQUITO CONTROL DISTRICT OF ST. JOHNS COUNTY



Hurricane Photos: <https://www.nnvl.noaa.gov>

2017 ANNUAL PROGRAM REPORT

(904) 471-3107 * 120 EOC Drive, St. Augustine, FL 32092 * www.amcdsjc.org

AMCD IS AN AMCA/CDC HUB HOST FOR TRAINING AND AN INTERN TRAINING CENTER
FOR THE CDC/UF/NE CENTER FOR VECTOR BORNE DISEASES.

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PREFACE

2

A MESSAGE FROM THE CHAIRPERSON



We had a very busy year in mosquito control in 2017. There were two hurricanes (Mathew in October, 2016 and Irma in September 2017) that happened in our financial year. Due to hurricane flooding and salt marsh mosquito outbreaks in 2017, we provided more than 5,000 service requests. St. Johns County residents have been free of locally-acquired mosquito-borne diseases for the past 14 years. The District attracted and received approximately 250 thousand dollars in grants, materials, labors, and other funds to assist the District's programs. We kept the same millage rate and did our best efforts to control the mosquito populations in the worst years, compared to the many years before. The phase II construction project has already begun and the Board approved to sell the North Station property at 10150 Cartwheel Bay in St. Johns, FL, near State Road 210. Thank you to our Board members, all AMCD employees and all of the St. Johns County citizens for their support.

A MESSAGE FROM THE DIRECTOR



Based on my last 14 years of experience, 2017 was the worst year in the mosquito population in St. Johns County due to hurricane Mathew in October of 2016 and hurricane Irma in September of 2017. There were 4-5 mosquito population outbreaks, especially salt marsh mosquitoes, on the island and Vilano Beach area this year. AMCD received and provided more than 5,000 service requests and conducted aerial spraying for several hot spots in late September after hurricane Irma. There were 2 imported Zika cases reported in St. Johns County which brings us a continuation of 14 years without locally acquired mosquito-borne diseases. AMCD has been recognized and appointed as one of ten hub hosts in the nation for AMCA and CDC contract training for trainers for the best practice for IMM and our hosting provided three training classes and certified 98 people and collaborated with DACS to provide 7 regional workshop trainings and trained more than 260 mosquito control professionals. AMCD, as a collaborator, received partial grants or equal value for labor or materials worth about \$250,000 from NIH, CDC, DACS, AMCA, 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 14th workshop and attracted 176 registrations from outside of AMCD. One commissioner and two employees received state awards. Luckily, I successfully served the FMCA as the President and continued to serve the Florida Entomology Society President, and was nominated to become AMCA Vice President, even though I lost the election. Thank you to our Board of Commissioners, all employees, and all collaborators and related organizations and agencies for their cooperation and supporting our programs.

BOARD OF COMMISSIONERS

3

**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
2017-2020**



APPOINTED OFFICERS



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



**Mr. Wayne Flowers,
Attorney, Since: 11-9-10**



**Ms. Julieann Klein, CPA
Since: 9-11-03**

AMCD FULL-TIME EMPLOYEES

4

OPERATIONS CONTROL

	Athan "Tom" Columbus, Supervisor Hired: 2-6-17		Kyle Arber, Mosquito Control Technician Hired: 5-01-17		Ken Daniel, Mosquito Control Tech. Hired: 9-26-05 Retired: 7-5-17		Morgan Duett, Mosquito Control Tech. Hired: 2-06-17
	Cathy Hendricks, Mosquito Control Tech. Hired: 7-08-02		Jerry Iser, Mosquito Control Tech. Hired: 2-02-15		Patrick Kendrick, Mosquito Control Tech. Hired: 4-07-03		Barry Scott, Mosquito Control Tech. Hired: 3-03-14
	Steven Smoleroff, Mosquito Control Technician Hired: 10/2/17		Steven Solana, Mosquito Control Tech. Hired: 4-24-00		Ricky Stockley, Mosquito Control Tech. Hired: 2-04-13		David Strickland, Mosquito Control Tech. Hired: 3-10-97
	Michael Vaughn, Mosquito Control Tech. Hired: 3-03-14		Jeremy Wholforth, Mosquito Control Tech. Hired: 2-06-17		Elaine Scanzani, Mosquito Control Technician Hired: 3-20-02 Ended: 5-26-17		

SURVEILLANCE/ENTOMOLOGY/EDUCATION

	Dr. Daniel Dixon, Molecular Biologist Hired: 2-16-16		Dena Autry, Mosquito Control Technician Hired: 8-24-15		Carlye Mangum, Mosquito Control Technician Hired: 9/5/17-		Christopher Bibbs, Biologist Hired: 6-02-14
--	---	---	--	--	---	---	---

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

	Micahel Smith, Field Biologist Hired: 11-05-84 Retired: 1-6-17
---	--

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

ADMINISTRATION



Rui-De Xue,
Director
(2005)

Hired:
4-14-03



Kay
Gaines,
Operations
Manager

Hired:
8-07-00



Charolette
M. Hall,
Admin.
Assistant

Hired:
11-05-07



Scott
Hanna,
Accountant

Hired:
7-03-07



Richard
Weaver,
Data
Manager

Hired:
4-14-03

MECHANICS:

	James Wynn, Mechanic Hired: 3-04-96
	John Freddie Allen, Mechanic Hired: 7-08-02

ADMINISTRATION ~ PERSONNEL & RECOGNITIONS

PERSONNEL

Dr. Mohamed Sallam continued working as a visiting scientist through March 30, 2017. Voluntary visiting scientist, Dr. Lei Luo from Guangzhou Center for Disease Control in Guangzhou, China, worked here from 5-1-17 through 10-25-17 as a Visiting Scientist.

There were 7 seasonal interns that worked at AMCD between March and November of 2017: Steven Smoleroff, Morgan Smith, and Carlye Mangum worked here 6 months; Hannah Swetnam for 5 months, Joseph Davis for 4 months; Heidi Knecht for 3 months and James Martin for 2 months.

2016 Seasonal Intern, Mr. Jeremy Wholforth and Seasonal Inspector/sprayer, Mr. Morgan Duett were promoted to a Mosquito Control Technician position that began February 6, 2017; Two of our 2017 Seasonal Interns were promoted to Mosquito Control Technician positions: Carlye Mangum on September 5th and Steven Smoleroff on October 2, 2017.

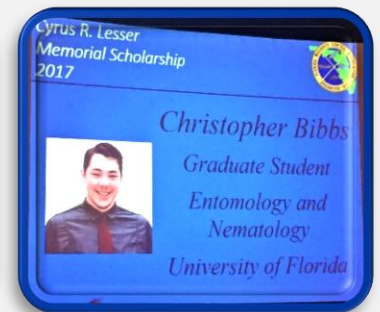
Mr. Michael Smith, Field Biologist retired on 1-6-17 after more than 32 years of service; Mr. Ken Daniel, Mosquito Control Technician, retired on July 5, 2017 after 12 yrs. of service, and Mosquito Control Technician, Ms. Elaine Scanzani's employment ended on May 26, 2017. The job title for Mrs. Marcia Kay Gaines, Supply Manager, was changed to Operations Manager in May 2017.



RECOGNITION

AND

AWARDS:



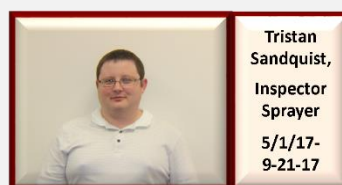
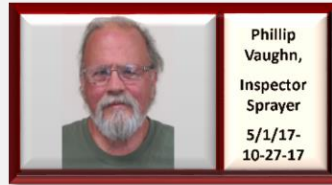
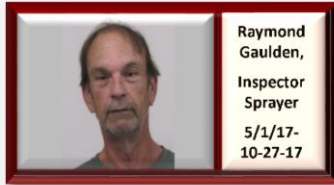
AMCD's District Director Dr. Rui-De Xue received a plaque at the 89th annual meeting of the FMCA in appreciation for his outstanding service as president of the FMCA, 2016-2017, Kissimmee, FL, Nov. 16, 2017. Dr. Xue was re-elected as the President (2017-2018) of the Florida Entomology Society by the Board after his 2016-2017 President service at 100th annual meeting, San Juan, Puerto Rico, July 21, 2017. Commissioner Jeanne Moeller, Board member of the FMCA, received the FMCA Presidential Citation award in appreciation for her contribution and outstanding service for the FMCA and AMCD applied research, legislation, and education programs. Biologist /Ph.D. student Christopher Bibbs received the Cyrus R. Lesser Memorial Scholarship for merit in public health mosquito control at the 89th FMCA annual meeting. He also received the Grinter Fellowship for scholastic merit from the University of Florida, and a travel grant from the Florida Entomology Society at their 100th annual meeting.

The following AMCD personnel received awards for their years of service with the District: Mr. David Strickland, Mosquito Control Technician, for 20 years; Ms. Cathy Hendricks, Mosquito Control Technician, and Mr. John "Freddie" Allen, Mechanic each for 15 years; Ms. Charolette M. Hall, Administrative Assistant and Mr. Scott Hanna, Accountant, each for 10 years; and The Managements Choice Awards were presented this year to Mr. Morgan Duett, Mrs. Dena Autry, Mosquito Control Technicians, and Ms. Charolette M. Hall, Administrative Assistant, for their significant contributions and dedication to the District this year.

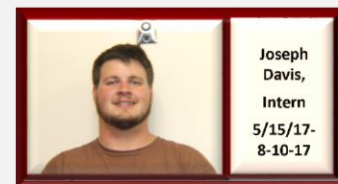
2017

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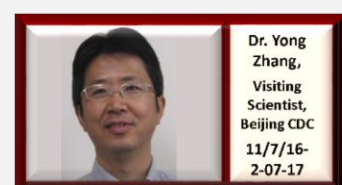
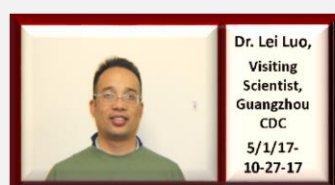
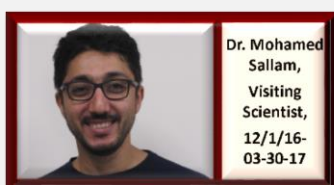
SEASONAL (6 MONTH) EMPLOYEES



INTERNS & VOLUNTEERS



VISITING SCIENTISTS



COMMITTEE MEMBERS 2017

7

SAFETY COMMITTEE:

Data Manager (Safety Coordinator):

Mr. Richard Weaver, (Chair)

Supervisor: Mr. Athan Tom Columbus

Operations Manager: Mrs. Kay Gaines

MC Technicians: Mr. Ken Daniels, Mr. Ricky Stockley; Mr. John "Freddie" Allen, and Mr. Steven Solana



APPLIED RESEARCH COMMITTEE:

Commissioner: Mrs. Jeanne Moeller (Chair)

Biologist: Mr. Christopher Bibbs

Molecular Biologist: Dr. Daniel Dixon

Biological Technician: Mr. Joseph D'Amato

Data Manager: Mr. Richard Weaver

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 Manager: Mrs. Kay Gaines

Biological Technician: Mr. Joseph D'Amato

MC Technician: Mr. Patrick Kendrick

PLANNING COMMITTEE:

Commissioner: Mrs. Gina LeBlanc, (Chair)

Director: Dr. Rui-De Xue

Supervisor: Mr. Athan Tom Columbus

Operations Manager: Mrs. Kay Gaines

Data Manager: Mr. Richard Weaver

Biologist: Mr. Christopher Bibbs

FINANCIAL / AUDIT COMMITTEE:

Commissioner: Mrs. Catherine Brandhorst, (Chair)

Director: Dr. Rui-De Xue

Accountant: Mr. Scott Hanna

Data Manager: Mr. Richard Weaver

Admin. Assistant: Ms. Charolette M. Hall

Operations Manager: Mrs. Kay Gaines

EMERGENCY RESPONSE COMMITTEE:

Operations Manager: Mrs. Kay Gaines

(Chair) *Supervisor:* Mr. Athan Tom Columbus

Data Manager: Mr. Richard Weaver,

Biologist: Mr. Christopher Bibbs

Admin. Assistant: 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

Operations: Mrs. Kay Gaines,

Data Manager: Mr. Richard Weaver

Molecular Biologist: Dr. Daniel Dixon

MC Technician: Mr. David Strickland

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.



At the February 9, 2017 Board meeting, the Board approved the Award of the RFP to Harrell Construction for the construction of the south parcel property, which will increase efficiency at AMCD. Then, at the August 10, 2017 Board Meeting, the Board approved the AMCD staff's recommendation to put the North Station property, located at 10150 Cartwheel Bay Avenue, St. Johns, FL 32259, up for sale.



AMCD continues providing many services to the citizens of St. Johns County, including, but not limited to: conducting inspections; mosquito control; eradication of the Zika Virus vector mosquitoes in downtown St. Augustine; working with and conducting public education and assistance for local organizations, schools, homeowners associations, and the community in general – to help control the populations of mosquitoes; continual surveillance to help reduce

the mosquito population and 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 equipment and methods to help in the control of mosquitoes.

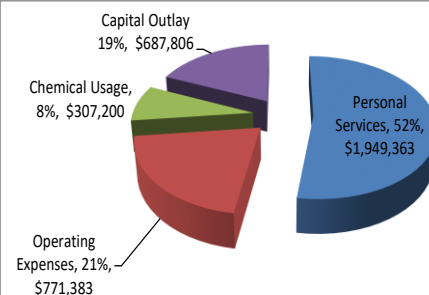
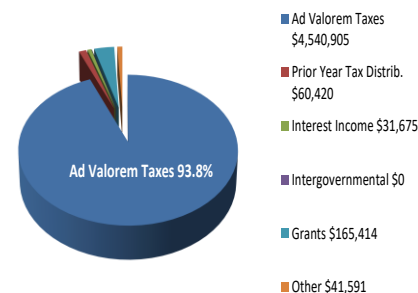
FY 16/17 District Revenues (Oct. 1, 2016 through Sept. 30, 2017)

Total (\$4,840,005)

- **Ad Valorem** (real property) **Current Year Taxes**, the primary source of revenue, comprised approximately 93.8% of totals.
- Optimism continued to prosper in the St. Johns County with a second year of rising Property values. **Grant Revenues**, majority derived from Applied Research, have increased to **\$165,414**, up from prior year amount, **\$51,581**.
- The District increased its **millage rate** to **0.2150**, up from the prior year **.1773** to facilitate Phase II of District Capital Facility expansion.

FY16/17 District Expenditures - Total (\$3,715,752)

Expenditures for the year were comparatively less than Revenues. The majority was attributed to incompleteness of the Phase II of District Capital Facility expansion which is extended into the next Fiscal Year. The Net difference between Revenues and Expenditures yielded a Surplus, which, when added to District's prudently, saved Reserves will be enough to finish the Complex in the 17/18 Fiscal Year.



2

ADMINISTRATION & SUPPLY

BOARD BUSINESS: AMCD staff provided many documents to Board members and the attorney for Board and Committee meetings in 2017 and supported 13 Board meetings, including the annual First and Final Public Hearings in September for the fiscal year budget and millage. The Board approved the "Sterile Insect Technique" for eradication of the *Aedes aegypti* mosquito in St. Augustine, Florida, at their March 9, 2017 Board meeting and the Service Request Phone App was approved with GeoMosquito Oct. 12th and the contract at the December 14, 2017 Board meeting.

INVENTORY: The annual physical inventory, monthly tire inventory, and chemical inventory were done regularly. Four vehicles were surplus April 13, 2017 and two vehicles, 1 ATV, and 1 UTV, along with various equipment and other items were surplus August 10, 2017.

DACS INSPECTION: The Department of Agriculture and Consumer Services conducts a "Mosquito Control Pesticide Use Inspection" every two years: as in 2015, it again reflected no deficiencies this year in 2017.

CONTRACTS: After approval from the Board, many annual contracts were 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 2017 (continually from 2003) with Julieann Klein from Lombardo, Spradley & Klein; the contract with Harrell Construction to construct the parcel on AMCD's south portion of the property at 120 EOC Drive in February 2017; with Vector Disease Control International for aerial spraying in large areas, with Application Dynamics, LLC for small areas; and an agreement under Resolution 2017-01 for the Florida State Division of Emergency Management's "Statewide Mutual Aid Agreement" in August 2017., the Cintas Uniform contract was approved at the September 14, 2017 Board meeting. Resolutions 2017-02 for the millage rate (0.2150) and 2017-03 for the Budget were approved September 28, 2017 at the Final Public Hearing; the FY 17-18 Mosquito Control Memorandum of Understanding for FDACS was approved October 12, 2017. We also update all Arthropod Managements Plans this year.

INSURANCE: The Board renewed the dental, life, and health, as well as fleet and Worker's Compensation insurances at the December 14, 2017 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. 14, 2017 Board meeting and the sales contract for the 500 Old Beach Road property sale to St. Johns County, February 9, 2017.

POLICIES: Staff continued updating the District's Policy Manual, Employee Handbook, and the Commissioner's Handbook in 2017 as policies were changed or added.

AMCD WEBSITE:

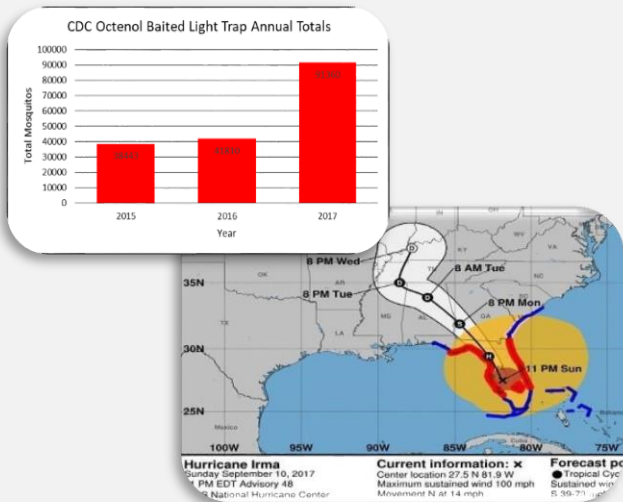
AMCD's website: www.amcdsjc.org continued to provide the following information: important links, public notices, meeting dates, illness advisories, training and workshop information, mosquito biology, as well as education and employment opportunities, and much more. AMCD is also active on Facebook and Twitter and hosts an online survey to determine customer satisfaction.

During 2017, AMCD continued utilizing the GeoMosquito database computer software program through the website for customer service requests and fogging and at the December 14, 2017 Board meeting, the Board approved GeoMosquito to implement the AMCD Phone App for service requests for St. Johns County citizens to now use their Android or I-Phone to enter service requests and/or check fogging and service request information via their phones and tablets.

We frequently updated our website in 2017 to enable our St. Johns County residents to be informed, check to see if their address was scheduled for fogging and to enter service requests.

AMCD answered 5169 service requests in 2017 from local residents by phone, online through our website, by e-mail, fax, and walk-ins.

The week following Hurricane Irma, (September 10, 2017) the District received 1,196 service requests in that week alone.



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 and other insects, mosquito prevention and pesticide applications, 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.



11:27 AM

Comments

Cat CrazyLady added 3 photos and 2 videos — 🙏 feeling grateful at Anastasia Mosquito Control District.
24 mins • Saint Augustine, FL • 📍

Very nice service received from this young man.

Wow! I'm impressed! Called for service and Kathy knocked on my door less than two hours later. She explained was she would be doing and then treated and sprayed for our overpowering mosquito problem.

Thank you for the great service. 🙌

Write a reply...

Cindy Rainey Ray from st. Augustine mosquito control is HEREEEEEE as I am posting this and he's treating my yard and he's a sweetheart..... He can't be any nicer.....my apologies to him and his office/staff!!!! Thank you for your IMMEDIATE attention to this terrible situation!!!!

★★★★★ FIVE STAR SERVICE RECEIVED!!!! THANK YOU RAY!!!!

Comment as Ana... GIF 📍 Post Write a comment... GIF 📍

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

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 2017 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 on attractive toxic sugar baits and ecology of vector mosquitoes.

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

AMCD hosted international visitors: Dr. Emad Khater, Dr. Hany Kamal, and Dr. Ernest Tambo from Saudi Arabia, Dr. Zhi-Ming Wu from China, and Mr. Chun-Hua Shen, CEO of LongRay, China during the annual workshop.

Collaborated with Dr. Tong-yan Zhao to organize the 5th International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases, Nanjing, China, May 22-28, 2017.

Dr. Xue visited Jiangsu Provincial CDC, Nanjing, China, May 24, 2017.

Dr. Xue gave a seminar on mosquito-borne diseases at Wuxi CDC, May 26, 2017.

Dr. Xue continues to collaborate with Dr. H.B. Yi from Korea on trapping.



Commissioners' Gary Howell, Jeanne Moeller, as well as Dr. Xue and Mr. Christopher Bibbs, attended the 100th annual meeting of the Florida Entomology Society, in conjunction with the Caribbean Country Food Crop Association's annual meeting, San Juan, Puerto Rico, July 17-21, 2017. Dr. Xue and Mr. Bibbs gave two presentations each.

Dr. Xue attended the 7th International Congress of SOVE, Palma, Spain, October 1-6, 2017 and gave a presentation on botanical repellents and new formulation at the repellents and insecticide symposium.

The District hosted visiting scientist Dr. Luo Lei from Guangzhou CDC who conducted two evaluations of ULV sprayer for Bti and a combination of adulticide and the IGR larvicide for control of larval and adult mosquitoes for 6 months, Dr. Zhang Yong from Beijing CDC until the end of Feb, 2017.



NATIONAL AND FEDERAL AGENCIES & ASSOCIATIONS:

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

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

Continued to collaborate with NECE, Jacksonville, FL to evaluate spray system and ovitraps, and employee training.

AMCD is the sustaining member of the AMCA and AMCA/EPA's PESP member and provided the annual report. AMCD has been appointed as one of ten hub hosts by AMCA for training trainers for best practice for IMM. AMCD, as a part of a team, joined and provided training for more than 260 people during 7 regional DACS & AMCA workshops in April, 2017 and organized 3 training classes and awarded 98 certificates nationwide. Dr. Xue and Mr. Bibbs organized different symposiums for the AMCA annual meeting, San Diego, Feb, 2017. Dr. Xue continues to serve the SOVE Board and a council member for the 7th International Congress of SOVE. Dr. Xue reviewed numerous numbers of manuscripts for the Entomological Society of American's three Journals, AMCA's JAMCA, SOVE's JVE, and as editorial Board member to review many manuscripts for Acta Tropica, and review other manuscripts for PLoS One, Environmental Health..



STATE AGENCIES AND SERVICES:

The FMCA: Dr. Xue, as President, and Commissioner Jeanne Moeller, as a Board member, served the FMCA in 2017. One commissioner and 2 staff members attended the FMCA 's Aerial Short Course, five commissioners and 9 employees attended the FMCA Dodd Short Courses, two commissioners and 2 staff members attended the FMCA Tallahassee Legislation meeting. Three staff members attended the FMCA Biologist/Entomologist workshop. Dr. Xue and Mr. Weaver, as FMCA financial committee members, attended the FMCA financial meeting. Three commissioners and 8 employees attended the FMCA annual meeting and gave 8 presentations.



The Florida Entomology Society (FES): Dr. Xue was re-elected as the President of the FES by the Board for another year of service at the 100th annual meeting, San Juan, Puerto Rico, July 17-21, 2017. Dr. Xue organized a Zika response symposium. Two commissioners and Mr. Bibbs attended the meeting, Mr. Bibbs and Dr. Xue gave two presentations at the Zika symposium and student competition. Mr. Bibbs was appointed to the FES Board as a student representative.

STATE AGENCIES AND SERVICES: (Cont'd)

The District collaborated with the FDACS to provide training at 7 regional workshops. Dr. Xue served the FCCMC Research Review Committee to review 29 grant applications. AMCD hosted the FCCMC meeting in May. AMCD and DACS renewed their contract.

The District collaborated with the DEP and State Parks to control mosquitoes and update the arthropod control plan.

The District collaborated with the State and St. Johns County DOH to fight Zika vector mosquitoes and responded to 27 suspected imported cases in St. Johns County in 2017. Dr. Xue, as a council member, to serve the County health leadership. AMCD collaborated with St. Johns County in public communications collaboration, the EOC for the FEMA project, the county parks for mosquito protection, the St. Johns County GIS Department for development and its impact on mosquito populations, and the School Board for student education on mosquito prevention.



Lee County
Mosquito Control
FMCA Fly In
Jan. 2017

COMPANIES AND OTHER DISTRICTS:

AMCD continued to cooperate with Central Life to evaluate of larvicide, MGK to evaluate new formulation of adulticide, American LongRay for equipment testing, SpringStar for AGO trap large deployment in St. Augustine and several other companies for repellent and trap testing. Flagler MCD for aerial larvicide.

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-Min Zhao for insecticide evaluation, Dr. Roxanne Connelly for insecticide resistance, and Dr. R. Dinglasan for the CDC Southeastern Center for Excellence in Vector-borne Diseases' project and intern student training.



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 continuously cooperates with the Florida Department of Health to monitor imported mosquito-borne diseases 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 ten sentinel chicken sites around St. Johns County. WNV was also monitored using the Rapid Analyt Measurement Platform (RAMP), colorimetric method for virus detection using mosquito pools.



AMCD personnel bled chickens every Monday, from April 4th to Nov. 27th and sent the blood samples to DOH's Arbovirus Laboratory which is in Tampa, for testing.

In 2017, a total of 2 sentinel chickens tested positive for arboviruses, 1 for SLE and 1 for WNV. There were no positive samples detected via RAMP assay for WNV.

AMCD also responded to a number of suspected cases of Chikungunya, Dengue, Malaria and Zika Viruses through surveillance and treatment of the area where the cases originated. In 2017, there were two (2) travel related suspected cases of Zika in St. Johns County. There were no travel related malaria cases this year. There was however, one (1) confirmed travel-related Dengue case this year. Finally, there were no locally acquired human cases of mosquito-borne diseases in St. Johns County in 2017.

MOSQUITO POPULATION:

The adult mosquito population was monitored by 32 CDC light traps baited with Octenol from April to November, 2017 and a total of 91,360 mosquitoes, consisting of 27 species, were collected. Twelve BG traps, baited with BG Lure and CO₂, were used for *Aedes albopictus* and *Aedes aegypti* for a total of 30,424 mosquitoes, consisting of 26 species, collected from January to December, 2017. A total of 121,784 mosquitoes were trapped by both methods.

Larvae surveys were conducted on a daily basis by dipping flooded areas as needed. A total of 30,808 dips were conducted and 5,031 dips were positive with 87,590 larvae found.

CDC Octenol Light Trap 2017	
1/1/2017 to 12/31/2017	
Trap Type : CDC Octenol	
Species Name	Species Total
<i>Ae aegypti</i>	0
<i>Ae albopictus</i>	159
<i>Ae atlanticus</i>	47103
<i>Ae canadensis</i>	0
<i>Ae fulvus pallens</i>	109
<i>Ae infirmatus</i>	10003
<i>Ae mitchellae</i>	0
<i>Ae signifera</i>	0
<i>Ae sollicitans</i>	178
<i>Ae taeniorhynchus</i>	1287
<i>Ae triseriatus</i>	1
<i>Ae vexans</i>	146
<i>An atropos</i>	0
<i>An bradleyi</i>	4
<i>An crucians</i>	9287
<i>An perplexens</i>	0
<i>An punctipennis</i>	1
<i>An quadrimaculatus</i>	155
<i>An walkeri</i>	1
<i>Cq perturbans</i>	42
<i>Cs inornata</i>	3
<i>Cs melanura</i>	64
<i>Cx coronator</i>	0
<i>Cx eraticus</i>	1841
<i>Cx nigripalpus</i>	11728
<i>Cx quinquefasciatus</i>	157
<i>Cx restuans</i>	0
<i>Cx salinarius</i>	0
<i>Cx territans</i>	0
<i>Ma dyari</i>	0
<i>Ma titillans</i>	5
<i>Or signifera</i>	0
<i>Ps ciliata</i>	380
<i>Ps columbiae</i>	7867
<i>Ps cyanescens</i>	3
<i>Ps ferox</i>	321
<i>Ps howardii</i>	224
<i>Tx rutilus</i>	0
<i>Ur lowii</i>	260
<i>Ur sapphirina</i>	31
<i>Wy Mitchellii</i>	0
Daily Total	91360

BG Trap 2017	
1/1/2017 to 12/31/2017	
Trap Type : BG	
Species Name	Species Total
<i>Ae aegypti</i>	3432
<i>Ae albopictus</i>	2859
<i>Ae atlanticus</i>	1256
<i>Ae canadensis</i>	0
<i>Ae fulvus pallens</i>	3
<i>Ae infirmatus</i>	3826
<i>Ae mitchellae</i>	0
<i>Ae signifera</i>	0
<i>Ae sollicitans</i>	721
<i>Ae taeniorhynchus</i>	7608
<i>Ae triseriatus</i>	1
<i>Ae vexans</i>	215
<i>An atropos</i>	0
<i>An bradleyi</i>	3
<i>An crucians</i>	343
<i>An perplexens</i>	0
<i>An punctipennis</i>	6
<i>An quadrimaculatus</i>	178
<i>An walkeri</i>	0
<i>Cq perturbans</i>	0
<i>Cs inornata</i>	12
<i>Cs melanura</i>	4
<i>Cx coronator</i>	0
<i>Cx eraticus</i>	205
<i>Cx nigripalpus</i>	4508
<i>Cx quinquefasciatus</i>	4646
<i>Cx restuans</i>	78
<i>Cx salinarius</i>	141
<i>Cx territans</i>	0
<i>Ma dyari</i>	0
<i>Ma titillans</i>	0
<i>Or signifera</i>	0
<i>Ps ciliata</i>	10
<i>Ps columbiae</i>	23
<i>Ps cyanescens</i>	0
<i>Ps ferox</i>	295
<i>Ps howardii</i>	43
<i>Tx rutilus</i>	6
<i>Ur lowii</i>	0
<i>Ur sapphirina</i>	0
<i>Wy Mitchellii</i>	2
Daily Total	30424

ENVIRONMENTAL PARAMETERS:

Rainfalls were monitored once a week using 32 rain gauges. The total annual rain average for 2017 was 32.84 inches.



Malaria vector
WNV/SLE vector
EEE vector
Dengue, yellow fever, chick-v, Zika

LARVICIDES AND LARVICIDING:

In 2017, 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 2,065 times on a total of 11,889.64 acres for larval control.

**ADULTICIDES AND ADULTICIDING:**

As a result of Hurricane Irma, in early September, an aerial spray was conducted in the hot spot area covering approximately 50,235 acres in St. Johns County, through Contractor, Vector Disease Control International, September 23, 2017.

Mosquito Control Technicians and Inspector/Sprayers continued to use Aqualure 20-20 (Permethrin) and Mosquitomist Two for ground ULV spraying and treated 542 times on a total of 384,888.64 acres for adult mosquito control. DUET was used for hand thermal fogging for service requests and other areas 715 times on a total of 14,091.63 acres. A record number of truck adulticide missions were conducted for a total of 458. Talstar P was used for barrier treatments in parks, special areas and for service requests 388 times for a total of 109.98 acres for adult mosquito control.



Most of this was conducted for mosquito populations and control of the Zika vector.

Larvicides and Adulticides Used in 2017

Larvicide	Amount Used	Area Treated	Times Applied
Altosid WSP	20807 ea	64.36 acre	413
Altosid XR	888 ea	2.03 acre	41
Altosid XRG	3991 lb	665.15 acre	120
Aquabac XT	81419 fl oz	10177.36 acre	997
B.t.i. Briquets	2417 ea	5.53 acre	113
Cocobear	10582 fl oz	27.59 acre	163
Natular DT	923 ea	0.13 acre	53
Natular T30	400 ea	0.92 acre	9
Natular XRT	143 ea	0.32 acre	11
Sustain MBG	1775 lb	250.4 acre	70
VectoBac 12AS	5760 fl oz	694.98 acre	68
VectoLex WSP	760 ea	0.87 acre	7
Adulticide	Amount Used	Area Treated	Times Applied
Aqualure 20-20 1:5	86110 fl oz	333325.2 acre	478
Dibrom Concentrate	46080 fl oz	76799.96 acre	1
Duet 50%	21920 fl oz	14091.63 acre	148
Mosquitomist Two	34032 fl oz	51563.42 acre	64
Talstar P	37.12 gal	109.98 acre	388

SOURCE REDUCTION & BIOLOGICAL CONTROL:

A total of 493 used tires were collected and removed throughout the year by AMCD staff and personnel, for source reduction.

Also, containers in and around residential yards, were emptied numerous times when AMCD staff and personnel performed their inspections.



AMCD provided the public with the mosquito larvae eating fish (named: Gambusia) for use in retention ponds and ditches 14 times.

AUTOCIDAL GRAVID OVITRAP (AGO) MASS DEPLOYMENT:

The U.S. CDC developed a non-chemical, lethal mosquito oviposition trap for use in residential settings. These traps have not been mass deployed in the continental United States before, so AMCD and Springstar collaborated to launch over 550 traps across three neighborhoods for a combination of surveillance and control of domestic mosquitoes in St. Johns County. This season-long project was part of a multi-state initiative to mass deploy these traps into the U.S., as well as a test launch of a non-prototype of this design since the CDC first developed it. The operations team, surveillance team, interns, and visiting scientists of AMCD all worked together to deploy, maintain, keep records on, and then recover these traps by 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.

EFFICACY OF NOVEL INSECTICIDES FOR MOSQUITO CONTROL:

Mosquito control has a more limited number of adulticide products available than other pest control industries. Because of this, new options are valuable to the continued success of mosquito control districts. In collaboration with MGK, a tool development company, an experimental ULV product was tested against mosquitoes in field relevant applications. This product was neither a pyrethroid, nor an organophosphate, but still yielded promising mosquito suppression.

Barrier sprays are a different option for strategic management of mosquitoes in focal areas. Steven Smoleroff, a Master of Public Health student interning with the AMCD, used a combination of lab and field work to test Cyzmic, Onslaught, and Deltagard, three pyrethroid products, alongside Essentria and Nature-Cide, two EPA exempt botanical products. He found that Nature-cide followed by Cyzmic outperformed the other options, and supported that green alternatives have options that may be useful to operations

And finally, a new product was made by Keyplex, a chemistry development company, that offered a botanical alternative to PBO, a common synergist in pyrethroid products. AMCD found their synergist to work as well as PBO in a field setting, and it will continue being developed as a green chemistry for enhancing mosquito control active ingredients.



EVALUATION OF TRAP TECHNOLOGY AND DISCOVERY OF DIEL ACTIVITY PATTERN WITH URBAN MOSQUITO SURVEILLANCE:

Similar to the AGO trap, there are other tools that take advantage of mosquito behavior. In collaboration with the CDC Southeastern Regional Center for Excellence in Vector-Borne Disease: The Gateway Program, Morgan Smith, a joint AMCD intern, evaluated the Trap N' Kill, In2Care dual action trap, and an experimental ovitrap. She found that the In2Care collected the highest number of eggs across the evaluated trap designs.

This was extended into an efficacy comparison between the AGO and In2Care, in which 200 traps were concurrently deployed in downtown St. Augustine for management of *Aedes aegypti*. This study provided information on the durability and general acceptance of these traps in urban hotspots. With modifications, each trap could be part of future strategies.

In expansion of her role, Morgan also deployed a mechanical rotator trap in areas experiencing domestic mosquitoes. Historically, this data has come from human-baited collections, which present risks for the participant. Her efforts established that you can generate records of mosquito daily activity across an entire 24-hr interval without exposing humans to risk.

ADAPTING EXISTING ULV TOOLS FOR MULTI-SPECTRUM LARVICIDING AND ADULTICIDING STRATEGIES:

Dr. Luo Lei, a visiting scientist from the CDC in Guangzhou, China, stayed with AMCD for a six-month term to evaluate machinery in mosquito control for new potential uses. The first major investigation was using a 4-nozzle, truck-mounted ULV machine and adjusting it for dispensing Bti. By testing a series of application rates and nozzle positions, he found that not only can Bti successfully be dispensed using this ULV machine, but you can achieve effective kill of larvae at a significantly lower rate than prescribed by the label.

Dr. Lei then moved on to begin evaluating multi-product application with a ULV backpack sprayer. In these tests, both Altosid, an insect growth regulator that kills immature mosquitoes, and Aqualuer 20-20, an adulticide normally used on truck units, were combined in the backpack sprayer. This mixture was deployed in an environment representing the mixed habitat you would encounter when doing residential treatments for service requests, with a mix of adult and larval mosquito habitat, and it was found that the mixture effectively killed mosquitoes across all life stages.



UNDERSTANDING MOSQUITO BIOLOGY AND ECOLOGY TO IMPROVE MANAGEMENT STRATEGIES:

Joe Davis, an intern also affiliated with The Gateway Program, conducted a study of three subdivisions that had a heavy call history of service requests from Hurricane Matthew rain events. The study compared the distances from wooded areas to the service request property and compared these distances to randomly chosen non-service-request properties. The study used data gathered from the AMCD data base, St. Johns County Property Appraiser office. Distance measuring was done using both Google Earth and actual visits to over 400 properties across the three subdivisions. The study concluded in all three subdivisions that the closer the property is to a wooded area, the more likely a homeowner is to call in a service request. This knowledge will allow AMCD to pretreat these wooded areas in the future to prevent mosquito population outbreaks and reduce the amount of service requests generated from subdivisions.

Joe's second project involved integrated Bti into an attractive toxic sugar bait. These baits are intended for control of adult mosquitoes, yet Bti is a larvicide. Bti affects the mosquito in part because of an alkaline gut in mosquito larvae. Adult mosquitoes also have an alkaline gut, albeit to a lesser extent. It was shown against *Aedes aegypti*, *Ae. albopictus*, and *Culex quinquefasciatus* that adult mosquitoes will die significantly within 24-48 hours of consuming ATSB laced with Bti.

CHARACTERIZING SUB-LETHAL EFFECTS OF SPATIAL REPELLENTS ON DOMESTIC MOSQUITO EGG LAYING ABILITY:

Spatial repellents are used by consumers in place of topical repellents to protect against mosquito bites. It has always been assumed that mosquitoes that survive or escape exposure to a spatial repellent will survive and bite a different person. The objective of this study was to determine if *Aedes aegypti* and *Aedes albopictus*, the two main contributors to the recent series of emergent tropical disease introductions, could be harmed through the use of spatial repellents in ways that affect egg laying ability. Our results show that these mosquitoes are no longer able to skip-oviposit, whereby the mosquito spreads eggs to many containers per clutch, after contacting spatial repellents. These mosquitoes also have reduced viability of the eggs, and some mosquitoes failed to lay eggs at all, instead experiencing ovarian death and rot in the eggs. These effects occurred up to a week following exposure to the spatial repellent, but before successfully blood-feeding.



COLLABORATIVE, ONGOING, AND COMPLETED
APPLIED RESEARCH PROJECTS FOR 2017

Downwind spatial toxicity of the off! Mosquito lamp against *Aedes aegypti* males and females

Evaluation of five insecticidal barrier sprays against *Aedes albopictus*

Screening of repellent adhesive patches for interrupting mosquito host-seeking

The impact of autocidal gravid ovitraps on *Aedes aegypti* and *Ae. albopictus* populations in saint johns county

Evaluation of a truck-mounted ULV sprayer with Bti against larval *Culex quinquefasciatus*

Backpack ULV efficacy of dual action treatment with Altosid SR-20 and Aqualuer 20-20 against *Cx. quinquefasciatus*

Sub-lethal effects of volatile pyrethroids on the fecundity and oviposition behavior of domestic mosquitoes

Comparison if the AGO and In2Care oviposition traps in concurrent deployments against *Aedes aegypti*

Upregulation of Bti specific resistance alleles in mosquitoes

Surveillance Program
Comparison if the AGO and In2Care oviposition traps in concurrent deployments against *Aedes aegypti*

Evaluation of Bti as a toxic sugar bait against adult mosquitoes

Retrospective correlation analysis of proximity to vegetation vs. Service request likelihood

Assessment of diel activity patterns of *Aedes aegypti* in St. Augustine using a mechanical rotator trap

Comparative evaluation of three oviposition traps for mosquito egg yield

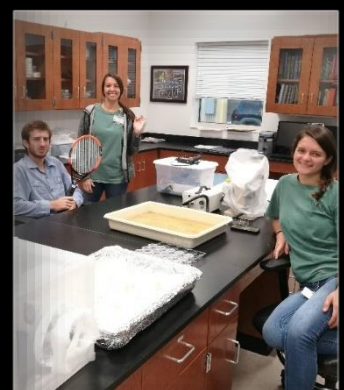
Vapor toxicity dose response of five volatile pyrethroids against four mosquito species

Evaluation of multiple trap types for EEE targeted capture of mosquito vectors

Dose response screening of five larvicidal modes of action against field strains of *Aedes sollicitans*

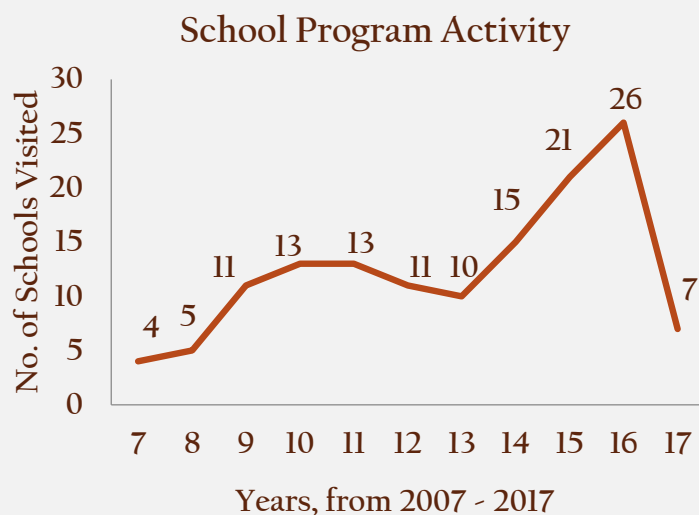
Collaborative evaluation of a novel insecticide class formulated by MGK for mosquito control

Collaborative evaluation of a novel botanical synergist developed by Keyplex to compete with PBO in pyrethroid formulations



AMCA/CDC CONTRACT TRAINING HUB HOST:

Dr. Xue and Mr. Bibbs the Southeast Region master trainers, along with other AMCD staff members, trained more than 250 mosquito control employees at 7 regional workshops in April, 2017 as a part of the DACS Zika vector control workshop. Dr. Xue and Mr. Bibbs organized three sessions of the CDC/AMCA Train The Trainer workshops. A total of 105 people attended and 98 people received certifications. All of AMCD's fulltime employees received certification along with three commissioners, five seasonal employees, two visiting scientists and five interns. The workshop participants came from nine industry groups, eighteen mosquito control organizations, six university groups, St. Johns County Department of Health, Florida Department of Agriculture and Consumer Services DPI and AES, Florida Department of Environmental Protection, US Airforce, US Environmental Protection Agency, US Department of Agriculture-CMAVE, and the US Navy Entomology Center of Excellence.

ST. JOHNS COUNTY SCHOOL PROGRAMS:

In 2017 AMCD taught at 6 different schools in St. Johns County, reaching 812 students across K-7th grade. Participating Elementary schools included: MK Rawlings, RB Hunt, and Wards Creek Elementary Schools. Participating Middle Schools included Valley Ridge Academy, St. John's Academy, and Cathedral Parrish. 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.

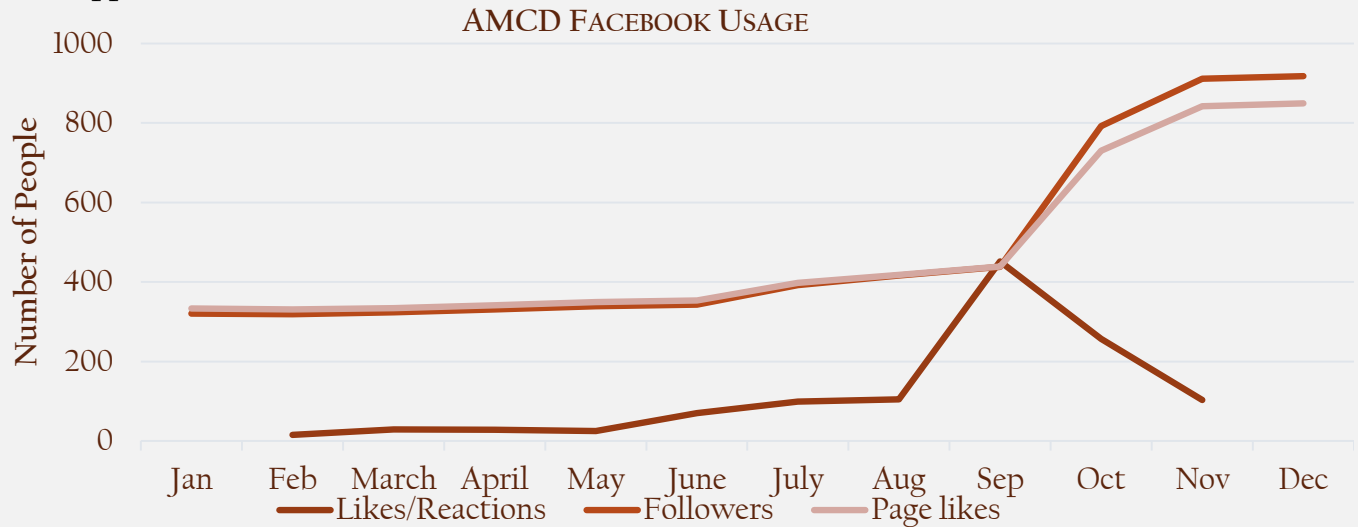
COMMUNITY EVENTS/PUBLIC OUTREACH:

AMCD was involved in 34 public outreach programs in 2017. Zika continued to be a common topic of discussion in 2017, but concern over Zika has decreased significantly from 2016. AMCD continued to work with St. Johns County Department of Health in both incident management and outreach education. The outreach program reached 13,392 people in 2017. Professional audiences were a particular emphasis, with 365 mosquito control, healthcare, and service professionals reached. AMCD received a trophy for the "most unique" Christmas Parade float in December 2017.

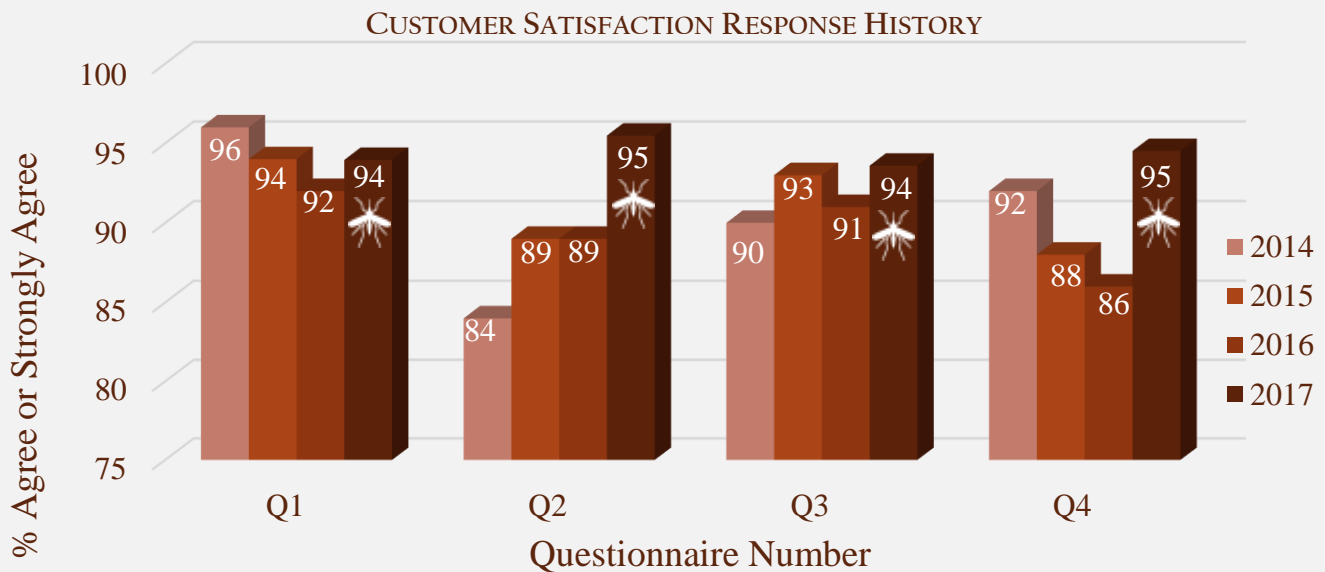


"Don't let mosquitoes steal your Christmas!" AMCD's 2017 Christmas Parade float. (Awarded - Most Unique)

PUBLIC RELATIONS: The District increased its presence on social media in 2017. The Anastasia Mosquito Control District's Facebook page now has over 900 followers and 850 page likes. Post reach and reactions increased as well. After Hurricane Irma, the District's posts reached over 17,000 people. In an effort to increase awareness of spray activity among St. Johns County residents, daily spray maps were created and published on Facebook, Twitter, and the District's website. The District's social media following increased steadily throughout 2017 with substantial increases resulting from mosquito outbreaks post Hurricane Irma and October's Nor'easters. The District was featured in sixteen TV news stories, four newspaper articles, and two radio appearances.



2017 CUSTOMER SATISFACTION SURVEY RESULTS: AMCD continues to gauge customer satisfaction using both physical and internet surveys. For 2017 there were 116 physical surveys returned and 11 internet surveys returned, for a total of 127 returned surveys.



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:

- January 4: Dr. RD. Xue attended the CDC teleconference on Section 18 application for mosquitomate.
- January 6: Dr. RD. Xue attended DACS's teleconference on SIT.
- January 9-11: Commissioner J. Rock, Dr. RD. Xue, and Mr. R. Weaver visited Pasco MCD, Collier MCD, Lee CMCD and attended the FMCA Aerial Short Course.
- January 19: AMCD held a lecture presentation for all employees, from the visiting scientist, Dr. Yong Zhang from Beijing CDC.
- January 18: Dr. RD. Xue attended the local Legislation meeting and Commissioner J. Moeller gave a speech about FMCA funds at the meeting.
- January 24: Dr. RD. Xue, Dr. D. Dixon and Mr. C. Bibbs attended the FCCMC meeting, UF Whitney Laboratory.
- January 25: AMCD hosted and held the AMCD and St. Johns County GIS collaboration meeting.
- January 30-Feb 2: Five AMCD Commissioners and seven employees attended the Dodd Short Course and Commissioner J. Moeller organized the Commissioner's Caucus at the Dodd Short Course.
- February 12-17: Dr. RD. Xue attended the AMCA annual meeting, San Diego, CA. and organized a symposium on *Aedes aegypti* control and Mr. C. Bibbs organized a symposium on spatial repellent.
- February 27-28: Dr. RD. Xue attended CDC's Zika Response meeting, Atlanta, Ga.
- March 14-15: Two Commissioners and 2 employees attended the FMCA Tallahassee Legislation meeting.
- March 22-24: Dr. RD. Xue & Mr. C. Bibbs attended the AMCA/CDC Certificate training in New Jersey.
- March 27: Dr. RD. Xue, as the President, held the Florida Entomology Society Board meeting at AMCD.
- March 28-30: AMCD/USDA/CMAVE organized the 14th Arbovirus Surveillance and Mosquito Control Workshop.
- April 3: Dr. RD. Xue attended Governor R. Scott and DOH Secretary Dr. Phil's teleconference on Zika prevention.
- April 7: Dr. RD. Xue attended and taught the Northwest Regional Zika Workshop, Crestview, FL.
- April 13: Mr. C. Bibbs & Ms. M. Clark attended and taught at the DACS Zika Response Workshop, Tallahassee, FL.
- April 14: Dr. RD. Xue attended the UF/EPI/CDC's Southeastern Excellence Center in Vector-borne Diseases meeting.
- April 17: Mr. C. Bibbs, Ms. M. Clark, and Dr. D. Dixon attended and taught at the DACS Zika Workshop, Tampa, FL.
- April 18: Dr. D. Dixon and Ms. M. Clark taught at the DACS Regional Zika Workshop, Lehigh and two other regional workshops.
- April 19: Dr. RD. Xue attended the St. Johns County DOH Leadership Council meeting.
- April 21: Dr. RD. Xue attended and taught at the DACS Zika Workshop, Gainesville, FL.
- April 28: Dr. RD. Xue, Mr. C. Bibbs and others attended the AMCD & MGK teleconference on Evaluation of Insecticide Formulations.
- May 8: Dr. RD. Xue attended and held the FMCA Board meeting, Kissimmee, FL.
- May 9: AMCD hosted the FCCMC meeting and Dr. RD. Xue, Mr. C. Bibbs, and Dr. D. Dixon attended the meeting.
- May 15-17: Commissioners' J. Moeller and J. Rock and Dr. RD. Xue attended the AMCA Washington DC Legislation meeting.
- May 22-25: Dr. RD. Xue, as the conference president, co-organized the 5th International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases, Nanjing, China. During the meeting, Dr. RD. Xue visited the Jiangsu CDC.
- May 26: Dr. RD. Xue gave a lecture on What happens for the next potential outbreak of mosquito-borne diseases, Wuxi CDC, China.
- June 13: AMCD hosted and held the AMCD and Navy NECE Collaboration Projects meeting. Mr. C. Bibbs gave a lecture on spatial repellents at the AMCA webinar.

- June 15: Dr. RD. Xue attended the teleconference on mosquitomate.
- July 17-21: Dr. RD. Xue, as the President of the Florida Entomology Society, held the 100th annual meeting in conjunction with the Caribbean Country Food, Crop Protection Assoc. annual meeting, San Juan, PR. and also organized a symposium on Zika vector control response. Commissioners' G. Howell, J. Moeller and Biologist Mr. C. Bibbs attended the meeting. Mr. C. Bibbs gave a talk during the student session and another talk at the Zika symposium.
- July 27 & 28: AMCD hosted and held the AMCA/CDC training class at AMCD.
- August 9: Dr. RD. Xue and Mr. R. Weaver attended the FMCA Financial Committee meeting, Vero Beach, FL.
- August 11: AMCD held a presentation on spatial repellent from one intern student.
- August 15: AMCD held a collaboration meeting between AMCD & NECE.
- August 16: Dr. RD. Xue attended the St. Johns County DOH's Zika response meeting and Leadership Council meeting.
- August 24 & 25: AMCD held an AMCA/CDC Training class at AMCD.
- August 29: Dr. RD. Xue attended an FCCMC Marsh Committee meeting, Jacksonville, FL.
- September 6: Dr. RD. Xue attended the UF/EPI's CDC Southeastern Center for Excellence in Vector-borne Diseases meeting, Gainesville, FL.
- September 18: Dr. RD. Xue attended the DACS teleconference and FMCA teleconference on nomination of officers.
- September 29: Dr. RD. Xue, as the FMCA Representative, attended the UF/IFAS awards dinner.
- October 1-6: Dr. RD. Xue attended the 7th International Congress of SOVE symposium and gave a talk on natural repellents, Spain.
- October 20: AMCD held presentations given by two AMCD interns and one visiting scientist.
- October 24 & 25: AMCD held and hosted an AMCA/CDC Training class here at AMCD.
- Nov 4-8: Mr. C. Bibbs attended NSFD, Industry Advisory Board meeting and annual meeting of the Entomological Society of America symposium and gave a talk on repellents, Denver, CO.
- November 8: AMCD hosted and held a collaboration meeting between AMCD & DEP State Park
- November 13: AMCD hosted and held a collaboration meeting between AMCD, St. Johns County, and DOH on improvement of community communication. Commissioner J. Rock, the St. Johns County Assistant Administrator, Communications Director and the St. Johns County DOH Public Relations Specialist attended the meeting.
- November 14-17: Commissioners' J. Moeller, G. LeBlanc, and J. Rock, and Dr. RD. Xue, along with 6 other staff members attended the 89th FMCA annual meeting and gave 8 presentations. Dr. RD. Xue was still the FMCA President for this meeting, Gaylord Palm, Kissimmee, FL.
- December 8-9: Dr. RD. Xue and Dr. D. Dixon attended a workshop on mosquito ecology and evolution, organized by UF/FMEL, Ft. Pierce, FL..



Bolded Names are AMCD Staff and Employees

American Mosquito Control Association 83rd Annual meeting, San Diego, CA, February 13-17, 2017.

Xue RD: Eradication campaign of *Aedes aegypti* in downtown St. Augustine, FL.

Xue RD: Evaluation of the IGRs and attractive toxic sugar bait stations against *Culex quinquefasciatus* in storm drains, St. Augustine, FL

Yi HB, Yu JS, Kim HJ, Kim SY, Lee SH, Han IO, Kim GD, Hong HS, Kim CB, Xue RD, Kim JG, Seok SW, Baek MJ, Bae YJ: The implementation of mosquito forecast system and the new development of the smart mosquito identification and counter device.

14th Arbovirus Surveillance and Mosquito Control Workshop, St. Augustine, FL. March 28-30, 2017.

Xue RD: Florida Mosquito Control Association and Florida Entomology Society update.

D'Amato J: Arbovirus and *Aedes* mosquito population surveillance in St. Johns County.

Wang Fei, Dixon D: Killing male mosquitoes using boric acid sugar baits and its impact on female fecundity and fertility of *Aedes albopictus*.

Zhang Yong, Weaver JR: Development and its impact on the mosquito population in St. Johns County.

Bibbs C: Toxicity of vapor active insecticides against multiple mosquito vectors.

Shen Y, Xue RD, Bibbs C: Insecticidal activity of three commercial spatial repellent candles against *Aedes aegypti*.

DACS & AMCA/CDC Hub Host Regional Zika Vector Control Workshop

Crestview, FL, April 7, 2017: Xue RD: Overview of AMCA /CDC contract training trainers for IMM,

Tallahassee, FL, April 13, 2017, Bibbs CS, Clark M: Overview of AMCA /CDC contract training trainers for IMM

Wimauma, FL, April 17, 2017: Bibbs CS, Dixon D, Clark M: Overview of AMCA /CDC contract training trainers for IMM

Lehigh, FL, April 18, 2017: Dixon D, Clark M: Overview of AMCA /CDC contract training trainers for IMM

Davie, FL, April 19, 2017: Dixon D, Clark M: Overview of AMCA /CDC contract training trainers for IMM

Cocoa, FL, April 20, 2017: Dixon D & Clark M: Overview of AMCA /CDC contract training trainers for IMM

Gainesville, FL, April 21, 2017: Xue RD: Overview of AMCA /CDC contract training trainers for IMM

The 5th International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases, Nanjing, China May 22-26, 2017.

Xue RD: Conference Presidential Address: What is next for outbreak of potential mosquito-borne diseases?

Xue RD: Population outbreak and control efforts after hurricane Mathew in St. Johns County, FL

Seminar at Wuxi CDC, China, May 26, 2017.

Xue RD. Recent outbreaks and epidemic of mosquito-borne diseases

Seminar at American Mosquito Control Association Webinar, June 13, 2017.

Bibbs CS: Spatial repellents for vector management: how do these things work?

Intern student presentation, AMCD, July 14, 2017.

Knecht, Heidi. Spatial repellents against male mosquitoes..

100th Annual Meeting of the Florida Entomology Society, San Juan, Puerto Rico, July 16-20, 2017.

Xue RD: FES Presidential address: Update FES

Bibbs C, Tsikolia M, Bernier U, Bloomquist J, Kaufman P, Xue RD: Evaluation of vapor active insecticides against multiple mosquito vectors.

Bibbs C: Bromeliads as habitat and potential sugar resources for *Aedes* mosquitoes.

Xue RD: Florida Mosquito Control Association response to Zika outbreak.

Xue RD: *Aedes aegypti* eradication efforts in downtown St. Augustine, FL.

Bolded Names are AMCD Staff and Employee

AMCA/CDC Training Hub Training Class for Certificate, AMCD, July 27 & 28, 2017.

Bibbs CS: Chemical control of larvae and adults, mapping & records.

AMCD's Intern Student Presentation, August 11, 2017.

Davis J: Relationship between service requests and vegetation.

Davis J: ATSB mixed with Bti against adult mosquitoes.

AMCA/CDC Training Hub Training Class for Certificate, AMCD, August 24 & 25, 2017.

Bibbs CS: Chemical control of larvae and adults.

Clark M: Mapping and records.

Dixon D: *Aedes aegypti* control in St. Augustine.

7th International Congress of SOVE, Palma, Spain, October 1-6, 2017.

Xue, RD: Symposium presentation: Laboratory evaluations of new formulations and application of natural repellents.

AMCD Interns and Visiting Scientist presentations, AMCD, October 20, 2017.

Smith M: Three trap collection comparison.

Smith M: Activity patterns of *Aedes* mosquitoes detected by mechanic traps.

Smoleroff S: Evaluation of five insecticides as barrier spraying against mosquitoes.

Luo L: ULV sprayer for Bti larvicide application.

AMCA/CDC Training Hub Training Class for Certificate, AMCD, October 25 & 26, 2017.

Bibbs CS: Resistance and larval control.

Clark M: Mapping and record.

Dixon D: *Aedes aegypti* control in St. Augustine.

All employee training on FMCA presentations, AMCD, October 27, 2017.

Eight employees gave their presentations (see in FMCA meeting in November).

National Sciences Foundation/University-Industry Cooperative, Center for Arthropod Management Technologies, Industry Advisory Board meeting, Denver, CO, Nov 4, 2017.

Bibbs CS, Hahn DA: Can sub-lethal exposure to spatial repellents affect mosquito blood-feeding or reproduction?

Entomological Society of American Annual Meeting, Denver, November 5-8, 2017.

Bibbs CS: Interrupting arthropod vectors using spatial repellents.

89th Annual Meeting of the FMCA, Kissimmee, FL, November 14-17, 2017.

Xue, RD, Presidential address: What happens next for potential outbreak of mosquito-borne diseases?

Linthicum K, Aldridge R, Britch S, Kline D, Hahn D, Boardman L, Xue, RD: SIT as a tool mosquito control districts can use for integrated *Aedes aegypti* control.

Bibbs C, Kaufman P, Xue, RD: Vapor toxicity of five volatile pyrethroids on multiple mosquito vectors.

Davis J, Weaver R, Xue RD: Retrospective correlation analysis of proximity to vegetation vs. service request likelihood.

Gaines K, Luo L, David J, Knecht H, Smoleroff S, Xue RD: Semi-field evaluation of a four nozzle cold fogger using Aquabac Bti against *Culex quinquefasciatus*.

Clark M, Davis J, Xue RD: An novel toxic sugar bait formulation using Bti.

Autry D, Dixon D, Gaines, K, Weaver R, Xue RD: Larger-scale deployment of CDC AGO traps in three subdivisions of St. Augustine and their control of *Aedes aegypti* and *Aedes albopictus*.

Dixon D, D'Amato J, Autry D, Xue RD: The spread of *Aedes aegypti* and its control efforts in St. Johns County.

D'Amato J, Autry D, Dixon D, Xue RD: Surveillance report of *Aedes aegypti* and *Aedes albopictus* in St. Johns County.

Bolded Names are AMCD Staff and Employee

1. Qualls WA, Scott-Fiorenzano JM, Muller GC, Arheart KL, **Xue RD**. 2016. Evaluation and adaptation of attractive toxic sugar baits for *Culex tarsalis* and *Culex quinquefasciatus* control in the Coachella Valley, Southern California. JAMCA 32:292-299 (not included in 2016 APR).
2. Scott JM, Seeger KE, **Gibson-Corrado J**, Muller GC, **Xue RD**. 2017. Attractive toxic sugar bait (ATSB) mixed with pyriproxyfen for control of larval *Aedes albopictus* (Diptera: Culicidae) through fecal deposits by adult mosquitoes. JME 54:236-238.
3. Scott-Fiorenzano, JM, Fulcher, AP. Seeger, KE, Allan, SA, Kline, DL, Koehler, PG, Muller, GC, **Xue, RD**. 2017. Evaluations of dual attractant toxic sugar baits for surveillance and control of *Aedes aegypti* and *Aedes albopictus* in North Florida. Parasites and Vectors 10:9.
4. Muller GC, Junnila A, Traore MM, Revay EE, Traore SF, Doumbia S, Schlein Y, Kravchenko VD, **Xue, RD**, Tsabari O, Beier, JC. 2017. A novel widow entry/exit trap for the study of endophilic behavior of mosquitoes. Acta Tropica 167:137-141.
5. **Gibson-Corrado, J**, **Smith ML**, **Xue RD**. 2017. Comparison of two new traps to the biogents BG-sentinel trap for collecting *Aedes albopictus* in North Florida. JAMCA 33:71-74.
6. Seeger KE, Scott JM, Muller GC, Qualls WA, **Xue RD**. 2017. Effect of common species of Florida landscaping plants on the efficacy of attractive toxic sugar baits against *Aedes albopictus*. JAMCA 33:139-141.
7. Wang F, Shen Y, **Dixon D**, **Xue, RD**. 2017. Control of male *Aedes albopictus* Skuse (Diptera: Culicidae) using boric acid sugar baits and its impact on female fecundity and egg hatching rate. JVE 42:203-206.
8. Lloyd, AM, Farooq, M, Estep, AS, **Xue, RD**, Kilne, DL. 2017. Evaluation of pyriproxyfen dissemination via *Aedes albopictus* from a point-source larvicide application in Northeast Florida. JAMCA 33:151-155.
9. Fiorenzano, JM, Koehler PG, **Xue RD**. 2017. Attractive toxic sugar bait (ATSB) for control of mosquitoes and its impact on non-target organisms: a review. International Journal of Environmental Research and Public Health 14:398.
10. Waits CM, Fulcher A, Louton JE, Richardson AL, Becnel JJ, **Xue, RD**, Estep AS. 2017. A comparative analysis of resistance testing methods in *Aedes albopictus* (Diptera: Culicidae) from St. Johns's County, Florida, Florida Entomologists 100:571-577.

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11. **Bibbs, CS**, Kaufman PE. 2017. Volatile pyrethroids as a potential mosquito abatement tool: a review of pyrethroid-containing spatial repellents. J. Of IPM 8:21.
12. **Dixon DP**, Van Ekeris L, Linser PJ. 2017. Characterization of carbonic anhydrase 9 in the alimentary canal of *Aedes aegypti* and its relationship to homologous mosquito carbonic anhydrases. In J Environ Res Public Health 14:213.
13. Farooq M, Fulcher A, Knapp JA, **Xue RD**, **Smith ML**, Anderson JJ. Effect of nozzle orientation on dispersion of Aqualuer 20-20 sprayed by the truck-mounted ULV sprayer against caged *Aedes aegypti*, JAMCA 33:209-214.
14. Shen, Y. **Xue, RD**, **Bibbs CS**. Insecticidal evaluation of three spatial repellent candles against *Aedes aegypti* (Diptera: Culicidae). JAMCA 33:
15. Gouge D. H., J. Hagler, S. Nair, K. Walker, S. L. Li, C. S. **Bibbs**, C. Sumner, and K. A. Smith. 2017. Human disease causing viruses vectored by mosquitoes, p1-7. Cooperative Extension Publication #AZ1744, University of Arizona, Tucson, AZ.
16. Gouge D. H., S. L. Li, S. Nair, K. Walker, and C. S. **Bibbs**. 2017. Mosquito and Tick Repellents, p1-6 in Ed. S. L. Li, School & Home Integrated Pest Management Newsletter. Cooperative Extension, University of Arizona, Tucson, AZ.

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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



AS ALWAYS, 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, COLLEAGUES, AND ALL CONTRACTORS, COOPERATIVE ORGANIZATIONS AND AGENCIES FOR THEIR ASSISTANCE IN 2017.