

ANASTASIA MOSQUITO CONTROL DISTRICT OF ST. JOHNS COUNTY



2019 ANNUAL PROGRAM REPORT

70 YEARS
of SERVICE EXCELLENCE

from
1949



Robert E. Bartnett
1952-1964 AMCD's
First Director

1949 Commissioners:

(no pictures)

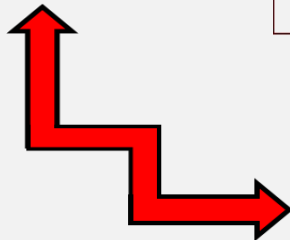
Mr. Robert W. Hamilton
(1949 -1950),

Mr. Charles E. Young
(1949-1951) and

Dr. Raymond Cafaro
(1949-1974)



AMCD's first
Employee George
Pitts 1950-1966



to the

present

2019



Current Director,
Dr. Rui-De Xue
2005 – present
Hired 4-14-03

Current Commissioners:

(left to right)

Mr. Don Girvan (2018-2020),

Mrs. Jeanne Moeller (2007-2022),

Mrs. Gina LeBlanc (2017-2020),

Mr. Gary Howell (2013-2020),

and Mrs. Trish Becker (2019-2022)



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A MESSAGE FROM THE CHAIRPERSON



In 2019, our District had a lot of accomplishments and we occupied building 500 (green houses and quarantine insectary), 700 (animal house), 800 (multi-purpose building, including pesticide storage, general storage, droplet size lab, and wind tunnel/olfactometer lab), and 900 (helicopter hangar). We decreased the millage rate from 0.220 to 0.210. For the first time, our District used our helicopter to treat more than 700 acres for larviciding. The District approved the RFP for the Education Center building and hired a consultant for the Good Laboratory Practice (GLP) and he conducted training and the pre-inspection. We changed benefits to the 1st day of hire and probation to 1 year. We also increased the minimum wage to \$15 per hour. I am happy to have successfully served the Board for the 4th year as Chairperson. I am very appreciative to all Board members and staff, and the employees for working together and for their support.

A MESSAGE FROM THE DIRECTOR

St. Johns County residents have been free of any locally-acquired mosquito-borne diseases for the past 16 years, even though there were two horses that tested positive for WNV & EEE, 54 sentinel chickens tested for WNV, and 8 for EEE. AMCD partially supported the AMCA annual meeting in Orlando in late February, hosted the 91st FMCA annual meeting in St. Augustine in the middle of November, and organized a successful 16th Arbovirus Surveillance



and Mosquito Control Workshop in late March which attracted 225 participants and created the first international session. The National Association of City and County Health Officers (NACCHO) awarded a grant to AMCD as the vector control mentor to provide training for the Gainesville mosquito control program. AMCD finished all construction and equipped all laboratories and facilities and has become a model of mosquito control organizations to have received many visitors from other mosquito control programs. AMCD received more than half a million dollars in grant funds from CDC/DOH and several other companies, to release SIT male mosquitoes, Wolbachia infected male mosquitoes, and for traps, larvicides, and repellent evaluations through the collaborations with UF, USDA/CMAVE, MosquitoMate, and other organizations. These grant funds benefited AMCD's operations program and assisted AMCD in hiring and training 6 visiting scientists and 8 intern students. I am happy to have received the AMCA President Citation Award in Orlando, Florida in late February and Mr. Richard Weaver received the FMCA Merit Award from the FMCA in November. I do appreciate the Board of Commissioners, all employees, and collaborators for their strong support in 2019.

**ANASTASIA MOSQUITO
CONTROL DISTRICT
OF ST. JOHNS COUNTY
BOARD OF COMMISSIONERS**



3

**ANASTASIA MOSQUITO
CONTROL DISTRICT
APPOINTED
OFFICERS**



**Mr. Gary
Howell
Seat 5
2013-2020**



**Mrs. Gina
LeBlanc
Seat 1
2017-2020**



**Mrs. Panagiota K.
"Trish" Becker
Seat 4
2019-2022**



**Mrs. Jeanne
Moeller
Seat 2
2007-2022**



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



**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

OPERATIONS

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

Steven
Kyle
Arbor,
Mosquito
Control
Technician
Hired:
5/01/17

Dr. Vindhya
Aryaprema,
FT Contract
Biologist
Sri Lanka
8/05/19-
9-30-20

Dena
Autry,
Assistant
Supervisor
Hired:
8/24/15

Kai Blore,
Biological
Lab
Technician
Hired:
4-02-19

Ralph
Bruner,
A&P
Aircraft
Mechanic
Hired:
9/3/19

Courtney
Cunningham
FT-Contract
Biological
Technician
8/5/19-
9/30/20

Morgan
Duett,
Mosquito
Control
Tech. ~
Surveillance
Hired:
2/06/17

Dr.
Muhammad
Farooq,
Field
Biologist
Hired:
9-16-19

Cathy
Hendricks,
Mosquito
Control
Technician
Hired:
7/08/02

Jerry
Iser,
Mosquito
Control
Technician
Hired:
2/02/15

PATRICK
KENDRICK,
MOSQUITO
CONTROL
TECHNICIAN
HIRED:
4/07/03

Dr.
Whitney
Qualls
Entomologist
/Scientific
Manager
Hired:
10/28/19

Barry
Scott,
Mosquito
Control
Technician
Hired:
3/03/14

Steven
Smolero,
Biological
Technician
Hired:
10/02/17

RICKY
STOCKLEY,
MOSQUITO
CONTROL
TECHNICIAN
HIRED:
2/04/13

DAVID
STRICKLAND
MOSQUITO
CONTROL
TECHNICIAN
HIRED:
3/10/97

JEREMY
WHOLFORTH,
MOSQUITO
CONTROL
TECHNICIAN
HIRED:
2/06/17





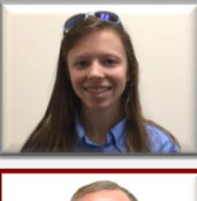





James
Wynn,
Mechanic
Hired:
3/04/96
also:
(10/30/89
-9/22/95)

ADMINISTRATION

	Rui-De Xue, Director (2005) Hired: 4-14-03		Marcia Kay Gaines, Operations Manager Hired: 8/07/00		Scott Hanna, Accountant Hired: 7-03-07
	Richard Weaver, Business Manager Hired: 4-14-03		Charolette M. Hall, Admin. Assistant Hired: 11-05-07		Edward Zeszutko, Education Specialist Hired: 5-13-19



RETIRED AND/OR RESIGNED 2019

	Christopher Bibbs, Biologist Hired: 6/20/14 Resigned 6/21/19		STEVEN SOLANA, MC TECHNICIAN HIRED: 4/24/00 RETIRED: 1/04/19		Michael Vaughn, Mosquito Control Technician Hired: 3-03-14 to 12-03-19		Dr. Daniel Dixon, Molecular Biologist Hired: 2-16-16 Resigned: 1-03-19		Molly Clark, Education Specialist Hired: 2/06/17 Resigned 3/28/19
	CARLYE MANGUM, MC TECH. ~ LAB HIRED: 9/05/17 RESIGNED: 1/22/19		Athan Tom Columbus Field Biologist Hired: 2/6/17 Retired: 7/31/19		Dr. Caroline Efstathion, Molecular Biologist Hired: 1/28/19 - 12-5-19		Kevin Card, Pilot-PT Hired: 8/26/19 Resigned: 12-30-2019		Peter Paul Leone, Pilot Hired: 10-22-18 Resigned: 8-1-19

PERSONNEL: Our volunteer visiting scientists in 2019 were: Dr. Hussein Sanchez-Arroyo, Univ. of Mexico, as a Post Doctorate & worked with AMCD & UF (8-1-18 to 7-31-19); Dr. Vindhya Aryaprema, Sri Lanka (3-18-19 to 8-02-19); Dr. Mohammad A. Miah, Univ. Sains Malaysia and Bangladesh, (6-3-19 to 8-30-19); Dr. Emad Khater, Cairo Egypt (7-15-19 to 9-15-19); & Dr. Shougang Zhang, Nanjing CDC, China (9-30-19 to 12-29-19).

In April 2019, the Board approved temporary full time positions which are grant funded and we hired Dr. Vindhya Aryaprema, Sri Lanka as a FT 14 month Biologist (8-05-19 to 9-30-20) and Ms. Courtney Cunningham as a FT 14 month Biological Technician (8-05-19 to 9-30-20).

The seasonal interns in 2019 were: Mr. Nicholas A. Acevedo (2nd yr) (1-7-19 to 10-31-19); Mr. Jacob Dilla (5-8-19 to 8-16-19); Ms. Lea M. Bangonan (6-3-19 to 02-20-2020) Ms. Courtney Cunningham (2nd yr) (6-3-19 to 8-02-19); & Ms. Catherine Whippen (1-14-19 to 2-6-19). Seasonal interns that worked for other entities at AMCD were: Ms. Caroline F. Blunck, MosquitoMate (1-7-19 to 6-28-19), & Ms. Mandi A. Pearson, Univ. of Florida (6-3-19 to 8-02-19); Ms. Pearson then worked as an AMCD Intern (8-5-19 to 1-31-20) and Ms. Blunck worked as an AMCD Intern (10-1-19 to 11-27-19).

May 1st through October 31, 2019, we had 4 returning seasonal (6 month) inspector/sprayers working at AMCD: Mr. Ray Gaulden (5th yr.), Mr. Phillip Vaughn (4th yr.), Mr. John Blalock (3rd yr.), and Mr. Dazmond Hackney (2nd yr.), as well as a maintenance & grounds inspector/sprayer, Mr. Michael D. McNulty (05-13-19 to 10-31-19).

New employees hired in 2019: Dr. Caroline Efstathion, Molecular Biologist (1-28-19); Mr. Kai Blore, Biological Lab Technician (4-2-19); Mr. Edward Zeszutko, Education Specialist (5-13-19); Mr. Kevin Card, Part-Time Pilot (8-26-19); Mr. Ralph Bruner, A & P Aircraft Mechanic (9-3-19); Dr. Muhammad Farooq, Field Biologist (9-16-19); and Dr. Whitney Qualls as Entomologist/Scientific Manager (10-28-19).

Employees that retired and/or resigned were: Dr. Daniel Dixon, Molecular Biologist resigned 1-03-19; Mr. Steven Solana, Mosquito Control Technician, officially retired 1-04-19; Ms. Carlye Tulley, Mosquito Control Lab Technician, resigned 1-22-19; Ms. Molly Clark, Education Specialist officially resigned 4-19-19; Mr. Christopher Bibbs, Biologist, officially resigned 6-21-19; Mr. Athan Tom Columbus officially retired 7-31-19; Mr. Peter Paul Leone, FT Chief Pilot, resigned 8-1-19; Mr. Michael Vaughn, Mosquito Control Technician, resigned 12-03-19; Dr. Caroline Efstathion, Molecular Biologist, resigned 12-5-19; and Part Time Pilot, Mr. Kevin Card resigned 12-30-19.

RECOGNITIONS AND AWARDS: Mr. Christopher Bibbs, received the Hollandsworth Prize honorable mention, in the 85th AMCD annual meeting's Student Paper Competition on February 28, 2019.

Dr. Rui-De Xue received the Presidential Citation Award on February 28, 2019 at the 85th AMCA annual meeting (Feb. 25 - March 1, 2019) in Orlando, Florida.

Dr. Rui-De Xue received a Past Present award at the 102nd Florida Entomology Society Meeting in Jupiter Beach, Florida on July 23, 2019.

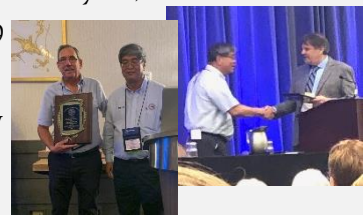
Mr. Richard Weaver, AMCD Business Manager, received the FMCA Merit Award at the 91st FMCA Annual meeting (November 17-20, 2019) in St. Augustine, FL on November 19, 2019.

The following AMCD personnel received an award for their years of service with the District: Mr. Barry Scott, MC Technician, for 5 years; and Mrs. Marcia Kay Gaines for Managements Choice Award for her significant contribution and dedication to the District, including during the hurricane Dorian preparations.

Commissioner Trish Becker and Mr. Wayne Flowers, AMCD Attorney, worked on



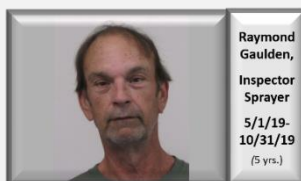
a Proclamation regarding an Anastasia Mosquito Control District Appreciation Day. The St. Johns County Commissions awarded the Proclamation to AMCD, Tues., Dec. 3, 2019 and then St. Johns County Commissioner, Jeb Smith presented it at the AMCD Board meeting on Thursday, December 12, 2019.



SEASONAL (6 mo.) EMPLOYEES

6

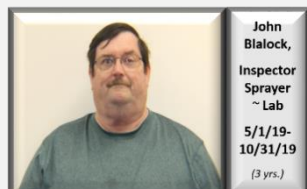
2019



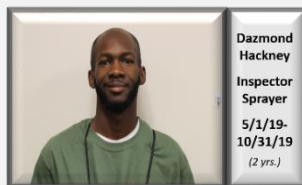
Raymond Gauden,
Inspector
Sprayer
5/1/19-
10/31/19
(5 yrs.)



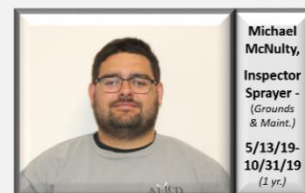
Phillip Vaughn,
Inspector
Sprayer
5/1/19-
10/31/19
(4 Yrs.)



John Blalock,
Inspector
Sprayer ~ Lab
5/1/19-
10/31/19
(3 yrs.)

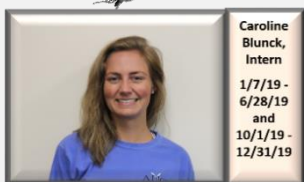


Dazmond Hackney
Inspector
Sprayer
5/1/19-
10/31/19
(2 yrs.)

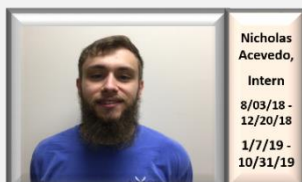


Michael McNulty,
Inspector
Sprayer -
(Grounds
& Maint.)
5/13/19-
10/31/19
(1 yr.)

INTERNS & VOLUNTEERS



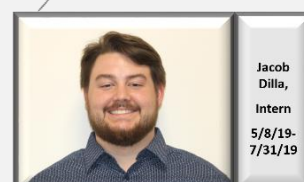
Caroline Blunck,
Intern
1/7/19 -
6/28/19
and
10/1/19 -
12/31/19



Nicholas Acevedo,
Intern
8/03/18 -
12/20/18
1/7/19 -
10/31/19



Catherine Whippen
Intern
1/14/19 -
2/6/19



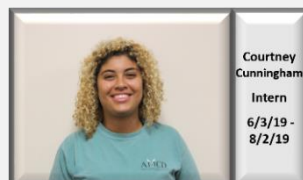
Jacob Dilla,
Intern
5/8/19-
7/31/19



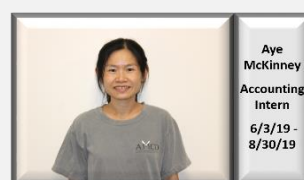
Lea M. Bangonan,
Intern
6/03/19 -
2/20/2020



Mandi A. Pearson,
UF Intern
6/03/19 -
8/30/19
AMCO
INTERM
8-5-19 to
1-31-2020

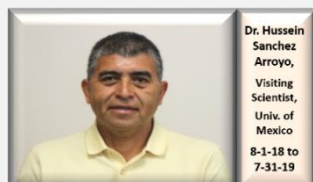


Courtney Cunningham
Intern
6/3/19 -
8/2/19

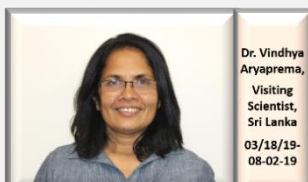


Aye McKinney
Accounting
Intern
6/3/19 -
8/30/19

VISITING SCIENTISTS



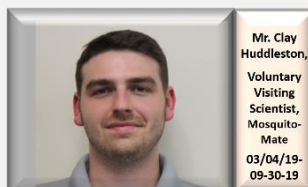
Dr. Hussein Sanchez Arroyo,
Visiting
Scientist,
Univ. of
Mexico
8-1-18 to
7-31-19



Dr. Vindhya Aryaprema,
Visiting
Scientist,
Sri Lanka
03/18/19-
08-02-19



Dr. Shougang Zhang
Visiting
Scientist
Nanjing
CDC, China
10/01/19-
12-31-19



Mr. Clay Huddleston,
Voluntary
Visiting
Scientist,
Mosquito-
Mate
03/04/19-
09-30-19



Dr. Mohammad Miah,
Visiting
Scientist,
Bangladesh
6-13-19 to
8-30-19

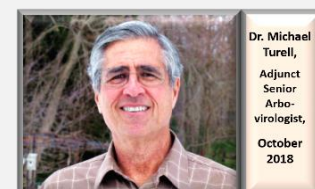


Dr. Emad Khater,
Visiting
Scientist,
Ain Shams
Univ., Cairo,
Egypt
7-15-19 to
9-15-19

ADJUNCT PROFESSORS



Dr. Gunter Muller,
Adjunct
Senior
Vector
Ecologist
October
2018



Dr. Michael Turell,
Adjunct
Senior
Arbo-
virologist,
October
2018

SAFETY COMMITTEE:

Business Manager (Safety Coordinator):

Mr. Richard Weaver, (Chair)

Operations Mgr.: Mrs. Marcia Kay Gaines

Asst. Supervisor: Mrs. Dena Autry

Pilot or Mechanic: Mr. Ralph Bruner

Biological Technician: Mr. Steven Smoleroff

Surveillance Technician: Mr. Morgan Duett

MC Technician: Mr. Ricky Stockley;

Mechanic: Mr. John "Freddie" Allen,

APPLIED RESEARCH COMMITTEE:

Commissioner: Mrs. Jeanne Moeller
(Chair)

Entomologist/Scientific Manager:

Dr. Whitney Qualls

Business Manager: Mr. Richard Weaver

Field Biologist: Dr. Muhammad Farooq

Molecular Entomologist: Dr. Caroline Efstathion

Assistant Supervisor: Mrs. Dena Autry

Biological Technician: Mr. Kai Blore

Biological Technician: Mr. Steven Smoloeroff

Data Manager: Mr. Richard Weaver

Education Specialist: Mr. Edward Zeszutko

EDUCATION COMMITTEE:

Commissioner: Mrs. Trish Becker (Chair)

Education Specialist: Mr. Edward Zeszutko

Molecular Entomologist: Dr. Caroline

Efstathion

Operations Mgr.: Mrs. Marcia Kay Gaines

Assistant Supervisor: Mrs. Dena Autry

Biological Technician: Mr. Steven Smoleroff

Entomologist/Scientific Mgr.:

Dr. Whitney Qualls

FINANCIAL/AUDIT COMMITTEE:

Commissioner: Mr. Don Girvan (Chair)

Director: Dr. Rui-De Xue

Accountant: Mr. Scott Hanna

Business Manager: Mr. Richard Weaver

Admin. Assistant: Ms. Charolette M. Hall

Operations Mgr.: Mrs. Marcia Kay Gaines

Pilots: Mr. Paul Leone (FT) and

Mr. Kevin Card (PT)

PLANNING COMMITTEE:

Commissioner: Mrs. Gina LeBlanc, (Chair)

Director: Dr. Rui-De Xue

Field Biologist: Dr. Muhammad Farooq

Operations Mgr.: Mrs. Marcia Kay Gaines

Business Manager: Mr. Richard Weaver

Assistant Supervisor: Mrs. Dena Autry

Biological Technician: Mr. Kai Blore

Entomologist/Scientific Mgr.:

Dr. Whitney Qualls

EMERGENCY RESPONSE COMMITTEE:

Operations Mgr.: Mrs. Marcia Kay Gaines
(Chair)

Field Biologist: Dr. Muhammad Farooq

Business Manager: Mr. Richard Weaver,

Entomologist/Scientific Mgr.:

Dr. Whitney Qualls

Admin. Assistant: Ms. Charolette M. Hall

Education Specialist: Mr. Edward

Zeszutko

OPERATIONAL COMMITTEE:

GROUND/AERIAL:

Commissioner: Mr. Gary Howell (Chair)

Director: Dr. Rui-De Xue

Field Biologist: Dr. Muhammad Farooq

Operations Mgr.: Mrs. Marcia Kay Gaines,

Business Manager: Mr. Richard Weaver

Assistant Supervisor: Mrs. Dena Autry

Pilots: Mr. Paul Leone (FT), and

Mr. Kevin Card (PT)

Molecular Entomologist: Dr. Caroline

Efstathion

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.

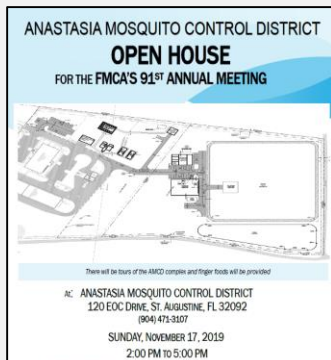
OUR PROGRAMS: Customer Service, Operations (including Surveillance and Control), Education, and Applied Research.



AMCD staff are all located in the growing Base Station Complex at 120 EOC Dr., St. Augustine, FL. Harrell Construction Co., Inc. completed construction of the 8 acre south parcel and research property on October 30, 2019, which will increase efficiency at AMCD.

AMCD held an OPEN HOUSE & 70 Year Anniversary Celebration on Thursday, June 27, 2019 from 4-7 PM.

All St. Johns County residents, as well as County and City government Boards, State Representatives and Senators were invited to the event. We had a great turnout with approximately 121 people attending, as well as AMCD personnel.



AMCD also hosted an Open House for the FMCA participants on Sunday, November 17, 2019 here at the AMCD complex. AMCD also hosted the Commissioner's Day for the 91st Annual FMCA Meeting on Tuesday, November 19, 2019, with Commissioner Jeanne Moeller as the moderator of the Commissioner Session.



As we have done since 1949, AMCD continued providing many services to the citizens of St. Johns County. Many things in 2019 included, but was not limited to: conducting inspections; mosquito control; working with and conducting public education and assistance for local organizations, schools, home-owners associations, and the community in general –

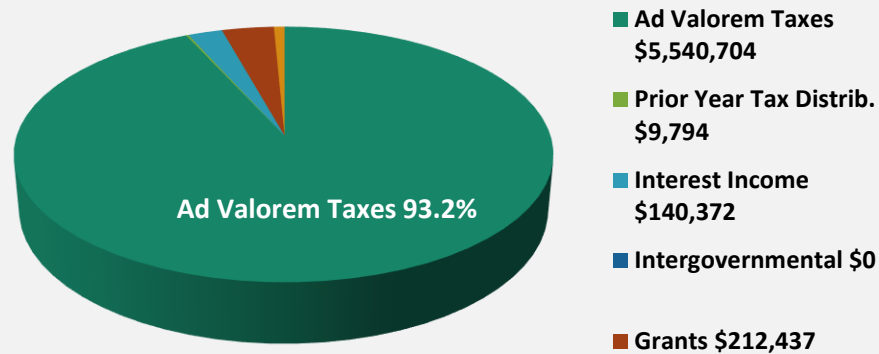


to help control the populations of mosquitoes; continual surveillance to help reduce the mosquito population and to reduce the chance of human virus association and to protect the environment; conducting larviciding and adulticiding especially during the mosquito season from March through November; increased 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 and efficient operation.

FY 18/19 District Revenues
Fiscal Year October 1, 2018 -September 30, 2019

FINANCIAL SUMMARY

Total Revenues \$5,947,057



Ad Valorem (real property) Current Year Taxes, the primary source of revenue, \$5,540,704 comprised of, approximately, 93.2% of the total Revenues, \$5,947,057

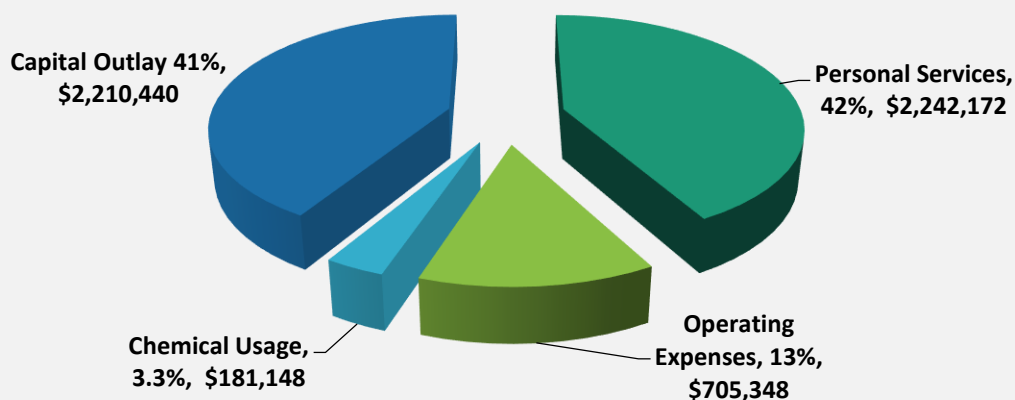
Grant Revenues, from Applied Research, Totaling \$212,437, shows continued growth.

Interest Income- Return on Investment, SBA Fund, non-current Operating Funds, yielded \$140,372.

Other Revenues, comprised of \$7,152 Workshops in house, \$12,547 Surplus Sales, \$17,973 FEMA Hurricane Irma, State Portion, \$6,079 Dorm Rents.

The District's millage rate for the General Operating Budget was 0.2200 for the year.

Total Expenditures \$5,339,108



Expenditures for the year were comparatively less than Revenues. The majority were attributed to Personal Services, 42%, and Capital Outlay, 41%, in which \$2,002,887 comprised of completing the District Facility Expansion Project.

BOARD BUSINESS: AMCD staff provided many documents to Board members and the attorney for Board and Committee meetings in 2019 and supported 12 Board meetings, including the annual First and Final Public Hearings in September for the fiscal year budget and millage.

INVENTORY: The monthly tire inventory and chemical inventory were done regularly. Two vehicles were surplus on the FY2018/2019 Surplus inventory noted at the January 10, 2019 Board meeting, as well as one ATV and two utility trailers, along with various equipment and other items; and the annual physical inventory was approved October 10, 2019.

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 2019 (continually from 2003) with Julieann Klein from Lombardo, Spradley & Klein; with MosquitoMate for a contract modification January 10, 2019; The Board also approved; the NACCHO Contract Sub-award Agreement March 14, 2019, the Cintas Uniform contract was approved at the September 12, 2019 Board meeting, Collaboration Grant Applications (CDC for SIT) and (DACS for Keystone Virus Survey) on March 14, 2019, 2 Grant funded 14 month term positions (Biologist and Biological Technician), April 11, 2019; Independent contractor agreements for aircraft mechanics on May 9, 2019, prior to hiring an AMCD mechanic in September 2019, Collaboration with DOD May 9, 2019, Arthropod Management Plan renewal for Anastasia State Park and St. Johns River Water Management Plan renewal on June 20, 2019, At the September 12, 2019 Board meeting, it was also approved for Proposal for GLP Consulting to certify AMCD Lab and facilities; Resolutions 2019-01 for the millage rate (0.2100) and 2019-02 for the Budget for FY 19/20 on September 26, 2019 at the Final Public Hearing; as well as the MOU renewal between FDACS and AMCD at the October 10, 2019 Board meeting. December 12, 2019 the Board approved the GLP Proposal for FY 19/20 and the AMCD and NECE CRADA Collaboration Non-Funded Agreement.

RFPs & BIDS: The Board approved an RFP for the Site Plan, Permits, and Design for the Disease Vector Education Center Building at the October 10, 2019 Board meeting, and the RFP was awarded to Harrell Construction Co., Inc. at the December 12, 2019 Board meeting. The Board also approved a Bid award to Arrow Aviation for the Main Rotor Hub Overhaul Bid at the December 12, 2019 Board meeting.

INSURANCE: The Board renewed Hull and Liability Insurance renewal July 11, 2019, as well as the annual renewals of the tank guard liability insurance, Fleet Liability and Workers Compensation Ins. at the September 12, 2019 Board meeting, and the dental, life, and health, insurances at the December 12, 2019 Board meeting.

POLICIES: At the July 11, 2019 Board meeting, the revised Pay Plan Policy was approved which determined that all new positions begin at a minimum wage of \$15.00 per hour or higher, which began October 1, 2019. Then at the October 10, 2019 Board meeting, the Board approved policy revisions for the Probation period to change from 6 months to 1 year (to begin January 1, 2020) and licensed interns to receive holiday pay and accrue annual leave, and leave computations to change from a calendar year to a fiscal year, which coincides with everything else that AMCD does, all on a fiscal year. The Board also approved, in October, giving health insurance benefits and leave to all newly hired full time employees from date of hire (also beginning January 1, 2020). The amended Administrative Leave Policy revision was approved at the December 12, 2019 Board meeting. Staff also worked on the newest revision of the Commissioner's Handbook with updated information, rearranged to have a policy section, information section, attachment section, and job description section, which will be presented for approval January 2020. Staff also continued updating the District's Policy Manual and Employee Handbook in 2019 with a complete restructuring, and updates with AMCDs conducting business with the new technologies and this will be presented for approval in 2020.

AMCD WEBSITE:

AMCD's web site: www.amcdsjc.org is an important tool for providing information to the public, other mosquito control districts, and staff. The site contains important information including: public notices, meeting dates, mosquito-borne disease advisories, training opportunities, education, and employment opportunities. One of the most important links on the AMCD web site is the service request button. At this link, St. Johns County citizens can enter requests for service. This service request is linked to the District's database, Geomosquito, and immediately notifies the AMCD technicians in the field that a request for service has been requested on their route. This page on the web site will also allow customers to access and review the status of a service request and see if there is any adulticide (fogging) scheduled in their area.

AMCD also keeps the public engaged using social media and has a presence on Facebook and Twitter. The Facebook site is very popular with a current following of approximately 1,260 friends. AMCD has also developed a free app to enter service requests, to check for adulticiding (fogging), and the ability to get important notifications from the District. This free app is available for iPhone and Android phone users.

AMCD staff frequently updated our website in 2019. In 2020 AMCD is planning to roll out a complete new website that will be more user friendly and contain more information. The new site will still have important links for service requests and adulticiding (fogging) information.

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

AMCD responded to 1,540 service requests in 2019. The average response time for a service request was 1.6 days. Service requests were received into the District office via phone, email, website, and phone app with more than 75% of service requests coming in through the phone app and web interface.

AMCD held an Open House on June 27, 2019 which was open to all the citizens of St. Johns County. Many were invited, including the Bee Keepers Association, the Master Gardeners, as well as, the citizens of St. Johns County who were interested in what we do and who we are. AMCD staff conducted many detailed tours of the newly finished research facility to members of the public, local and State officials, members of the education system and other government agency's especially other mosquito control districts.

AMCD continued to provide service and to educate St. Johns County residents on many things such as, adult mosquitoes, larvae, adulticiding and larviciding. The AMCD staff also dispensed valuable information pertaining to the identification of mosquitoes, pesticide safety 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, including bee-keepers properties or personal conditions that warrant non treatment.

AMCD strictly adheres to the Florida Statutes, Chapter 388 and 5E-13 of the Florida Administrative Code. The District also follows all Florida Department of Agriculture and Consumer Services and Environmental Protection Agency rules. Labels and Safety Data Sheet instructions are closely followed, as well as, the District's own policies and procedures. AMCD is committed to public safety, while providing the important public service of larviciding and adulticiding in order to reduce the spread of vector disease and nuisance mosquitoes.

AMCD works in cooperation with many local, state, federal, national and even international agencies, as well as, private and commercial organizations and members of the medical community, in the fields of biology and control of mosquitoes and mosquito-borne diseases. Those listed below briefly describe the work associations with AMCD in 2019 in prevention and control of vector-borne diseases in Florida.

INTERNATIONAL COOPERATION AND ACTIVITIES:

Continue the collaboration with Dr. Gunter Muller, the University of Science, Techniques, and Technology of Bamako, Mali on Attractive Toxic Sugar Baits (ATSB) against vector mosquitoes.

Continue the collaboration with Dr. Tong-Yan Zhao, Beijing Institute of Microbiology and Epidemiology & Entomological Society of China to have organized the 6th International Forum for surveillance and control of mosquitoes and vector-borne diseases, Xiamen, China, May 26-30, 2019.

Collaboration with the Asian Society of Vector Ecology and Mosquito Control and Taiwan Environmental Pest Control Association to have organized Environmental Agents and Vector Management International Workshop, Taipei, Taiwan, May 31, 2019.

AMCD hosted international visitors: Dr. Emad Khater, Egypt for 2 months, Dr. Shougang Zhang, Nanjing City CDC for 3 months, Dr. Mohammad Miah, Bangladeshi for 3 months, Dr. Vindya Aryprema, Sri Lanka for 5 months, Dr. Hussein Sanchez-Arroyo, Mexico for 7 months, Dr. Hongliang Chu, Nanjing, China for a short visit, Dr. Gunter Muller, Dr. Edita Revay, and Dr. Mohamed M. Traore, Bamako, Mali for a couple of weeks in October, 2019.

Continued Collaboration with Jeddah City's Department of Environments, Saudi Arabia for dengue vector control consulting in early November 2019.

Dr. Xue attended the WHO & Wageningen University's International Conference on innovative strategies for vector control progress in the global vector control response, Wageningen, Netherlands, June 11-13, 2019.

AMCD began collaboration with IMAAC/COST (Europe Collaboration in Science and Technology) on nanotechnology & textile with natural repellents against vector mosquitoes. Dr. Xue was invited to give a presentation on standardization for repellent testing at the work group workshop, Malta, middle of December, 2019.

Commissioners' Gary Howell & Jeanne Moeller, along with Dr. Xue, attended the SOVE annual meeting in Puerto Rico in late September 2019.

Dr. Xue continues to serve the World Mosquito Control Association as Executive Director and joined the Board meeting in Puerto Rico in late September 2019.

NATIONAL AND FEDERAL AGENCIES & ASSOCIATIONS:

Continued collaboration with USDA/CMAVE to organize the annual workshop and SIT for control of *Aedes aegypti* and other studies.

Continued collaboration with NECE, Jacksonville, FL to evaluate ULV spray systems and new formulations of insecticides.

AMCD is a sustaining member of the AMCA and an AMCA/EPA PESP member. Dr. Rui-De Xue co-organized the *Aedes* mosquito management symposium and was the local committee Co-Chair for the AMCA annual meeting, Orlando, in late Feb, 2019. Also, AMCD sent 4 volunteers to assist the AMCA annual meeting. Dr. Xue and Commissioner Jeanne Moeller attended the AMCA's DC Legislation meeting in May 2019.

AMCD received a grant fund from the NACCHO as a mentor to provide training for the Gainesville Mosquito Control program from February to July, 2019. Dr. Xue gave a presentation on creating mosquito control programs at the NACCHO's Vector Summit in Pittsburg, PA in the middle of April 2019. Also AMCD hosted two visitors from NACCHO for program evaluation in June 2019.

Dr. Xue continues to serve the SOVE Board as the Regional Director.

Dr. Xue reviewed numerous numbers of manuscripts for the ESA's Journal, AMCA's JAMCA, SOVE's JVE, Acta Tropic, PLoS one, Parasite & Vectors, Insects, and several other journals at their editors' requests.

STATE ASSOCIATIONS, AGENCIES AND SERVICES:

The FMCA: AMCD hosted the 91st annual meeting in St. Augustine, FL, November 17-20, 2019. Dr. Xue served on the Nomination, Research, and Exchange Committees and as editor of the JFMCA, collaborated with 3 assistant editors to edit and publish the JFMCA vol. 66, 2019. Mr. Richard Weaver served on the Financial Committee, and Commissioner Jeanne Moeller served on the Legislation Committee. AMCD staff gave 13 presentations at the annual meeting.

The FES: Dr. Xue, as the past President, served the Florida Entomology Society (FES) and received the Past President Award in Jupiter Beach in late July 2019. AMCD staff gave 2 presentations.

DACS: AMCD renewed the contract with DACS and hosted the FCCMC meeting in February. Dr. Xue continues to serve the FCCMC research sub-committee to review 26 grant applications.

DOH: AMCD attended the annual collaboration meeting of the DOH and AMCD in the middle of June. Both agencies collaborated to release news for a mosquito-borne illness advisory after three horses and many sentinel chickens tested positive for EEE and WNV.

DEP: AMCD collaborated with state parks and environmental education centers for surveillance and management of salt marsh mosquitoes. During the hurricane, AMCD hosted DEP and all their vehicles and boats on the AMCD property in early September 2019.

UNIVERSITIES

AMCD cooperated with: the University of Florida, Dr. Phil Kaufman, to train a Ph.D. student who graduated in August, 2019, Dr. Dan Hahn for the SIT grant, Dr. R. Dinglasan for the CDC SECEVD for intern training, and Dr. Phil Koehler for non-target impacts. AMCD also collaborated with Dr. G. Morris, EPI for the Keystone virus survey, and faculty at the FMEL for arbovirus and mosquito investigation in Northeastern Florida.

AMCD had an MOU in collaboration with UNF to train their summer intern students in the field of public health and the MOU has been renewed for 3 more years.

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: AMCD cooperated with Dr. Stephen Dobson on the Wolbachia-infected male mosquito release against Aedes mosquitoes in St. Augustine.

OTHER DISTRICTS AND COMPANIES

East Flagler Mosquito Control District: Both Districts collaborated with their aerial programs and the East Flagler Mosquito Control District's pilot assisted AMCD's interview of an A&P aircraft mechanic and the aerial program from September 20th through December, 2019th.

Volusia County Mosquito Control District: Volusia Mosquito Control District's mechanic assisted AMCD with their helicopter and AMCD's pilot assisted the Volusia Mosquito Control District to interview a pilot.

Gainesville Mosquito Control: AMCD provide training to the Gainesville Mosquito Control staff.

Union County Mosquito Control: AMCD assisted Union County to create a mosquito control program and to provide training.

AMCD hosted and gave tours to Beach Mosquito Control District, Orange County Mosquito Control District, Brevard County Mosquito Control District, and other Districts programs about AMCD's new complex and blue print.

OTHER COMPANIES

MGK: Collaborated for resistance and Metofluthrin.

DNW: Collaborated for larvicide evaluation.

ThermCell: Collaborated for mosquito repellent against ticks.

MosquitoMate: Collaborated for the Wolbachia-infected male mosquito release.

Spartan Mosquito Eradicator: Collaborated for the evaluation of the ATSB station.

Dyna Trap: Collaborated on trap evaluations.

Light Farmer: Collaborated on spatial repellent devices.

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 10 sentinel chicken sites around St. Johns County. WNV was also monitored using the Rapid Analyze Measurement Platform (RAMP), a colorimetric method for virus detection using mosquito pools. AMCD personnel bled chickens every Monday, from April 8th to November 29th and sent the blood samples to DOH's Arbovirus Laboratory in Tampa for testing.

In 2019, a total of 62 sentinel chickens tested positive for arboviruses, 8 for EEE and 54 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 2019, there was one (1) travel related suspected case of Dengue in St. Johns County. There were no other travel related cases this year. There were no locally acquired human cases of mosquito-borne diseases in St. Johns County in 2019.

There was however, one (1) confirmed horse that tested positive for EEE and one (1) horse confirmed positive with both WNV and EEE in 2019.

MOSQUITO POPULATION:

The adult mosquito population was monitored by 41 CDC light traps baited with Octenol from April to November, 2019 and a total of 13,263 mosquitoes (29 species) were collected. Twelve (12) BG traps, baited with BG Lure and CO₂, were used for *Aedes albopictus* and *Aedes aegypti* for a total of 17,788 mosquitoes collected from January to December, 2019. A total of 31,051 mosquitoes were trapped by both methods.



Larvae surveys were conducted on a daily basis by dipping flooded areas as needed. A total of 27,410 dips were conducted and 2,542 dips were positive with larvae.



ENVIRONMENTAL PARAMETERS:

Rainfalls were monitored by 12 rain gauges once a week.



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 148 times on a total of 97,087.10 acres for adult mosquito control. DUET was used for hand thermal fogging for service requests and other areas 111 times on a total of 6,684.10 acres. Talstar P was used for barrier treatments in parks, special areas and for service requests 297 times for a total of 99.8 acres for adult mosquito control.

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



Left: Backpack Spraying



Right: Aerial View Truck Mounted Thermal Fogging



Left: Truck Thermal Fogging

LARVICIDES AND LARVICIDING:

In 2019, the District primarily used Bti to kill mosquito larvae, as well as methoprene products in areas where BTI was not applicable.

MC Technicians and Inspector/sprayers treated 1,037 times on a total of 7,329.3 acres for larval control in both ground and aerial applications.



Larvicides and Adulticides Used in 2019

Larvicides	AMOUNT USED		AREA TREATED		TIMES APPLIED
Altosid WSP Ground	12,697	ea.	39.4	acres	148
Altosid XR Ground	412	ea.	0.9	acres	40
Altosid XRG Ground	1,680	lbs.	280.0	acres	31
Altosid XRG Air	10,080		1,008.0	acres	20
Aquabac XT Ground	39,400	fl.oz.	4,898.0	acres	520
Bti Briquets Ground	669	ea.	1.5	acres	40
Cocobear Ground	4,302	fl.oz.	11.2	acres	122
Natular DT Ground	149	fl.oz.	0.0	acres	18
Sustain MBG Ground	4,202	lbs.	560.3	acres	58
Sustain MBG Air	960	lbs.	96.0	acres	4
VectoBac 12AS Ground	3,920	fl. oz.	434.0	acres	36
Adulticides	AMOUNT USED		AREA TREATED		TIMES APPLIED
Aqualure 20-20 1:5 Ground	14,083.67	fl.oz.	54,517.4	acres	93
Dibrom Air	128	fl.oz.	231.3	acres	1
Duet 50% Ground	10,494	fl.oz.	6,684.1	acres	111
Mosquitomist Two Ground	28,096	fl.oz.	42,569.7	acres	55
Talstar P Barrier	33.64	gal.	99.8	acres	297

SOURCE REDUCTION & BIOLOGICAL CONTROL:



There were 200 used tires that were collected & removed throughout the year by our AMCD staff & personnel, for source reduction. Containers in and

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

AMCD provided the public with 67 mosquito larvae eating fish named "Gambusia" for use in retention ponds and ditches in four (4) locations in 2019.

SURVEILLANCE OF IMPORTANT ARBOVIRUSES IN NORTHEAST FLORIDA:

AMCD collaborated with the University of Florida and received two Florida Department of Agriculture and Consumer Services (FDACS) grants. The first FDACS grant was to investigate the prevalence of the Keystone virus (KEYV) in mosquitoes collected in St. John's County. Keystone virus (KEYV), was first isolated in 1964 from mosquitoes in Keystone, Florida. KEYV is considered a forgotten virus, and no recent data is available from the state of Florida on mosquito infection rates or other vector competence such as *Aedes infirmatus* or *Aedes albopictus* for disease transmission. AMCD, in collaboration with the UF/ Emerging Pathogens Institute, started the project in June targeting *Ae. atlanticus*, *Ae. infirmatus* and *Ae. albopictus*. To date, approximately 15% of *Ae. atlanticus* pools tested positive for KEYV at three locations within the county. This project will continue until July 2020.

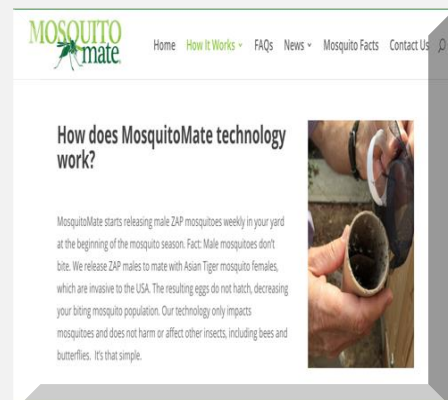
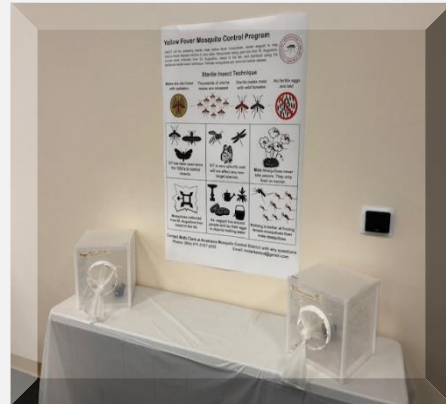
The second FDACS project is a collaboration of the UF/Florida Medical Entomology Laboratory, AMCD, the City of Jacksonville Mosquito Control, and Volusia County Mosquito Control. The goal is to better understand factors influencing West Nile virus (WNV) and Eastern Equine Encephalitis virus (EEEV). To lower future virus outbreak risks, targeted vector control is needed based upon a robust understanding of ecological factors contributing to the virus. This data, combined with georeferenced interactions between vector and host species and environmental variables, can be used to produce predictive models of WNV and EEEV transmission potential and identify areas to target additional mosquito control activities. This project is underway and will continue until July 2020.



NOVEL CONTROL STRATEGIES FOR IMPORTANT VECTORS :

Release of irradiated male *Aedes aegypti* mosquitoes, sterile insect technique (SIT), into the target environment is one such species specific control option. Irradiation results in the male mosquitoes becoming reproductively sterile. The released SIT male mosquitoes mate with the wild females, thus resulting in unfertilized eggs reducing the population density. An operational pilot study was done to evaluate the effects of mass release of SIT males on the St. Augustine strain of *Ae. aegypti* in collaboration with USDA/CMAVE and UF. Baseline data collections on wild *Ae. aegypti* populations at the treatment site and control site were carried out from June to October 2019. Preliminary releases of irradiated marked (pigmented) males started in late October to determine their dispersal within the target site, imposed effects on population densities and induced sterility in the field in comparison to those at the control site. Seven weekly SIT were conducted. Monitoring in both sites was carried out with BG Sentinel traps and 24 ovi-cups. A suppression field trial will begin in March 2020. This is funded by CDC/DOH.

Release of *Wolbachia*-infected male *Aedes aegypti* and *Ae. albopictus* to control natural population of *Aedes* mosquitoes was conducted in St. Augustine South. This is a collaboration project with MosquitoMate. The preliminary results showed that more than 70% natural population of *Ae. albopictus* had been reduced after multiple releases in the treated area, compared with the untreated area. This projected is funded by MosquitoMate.

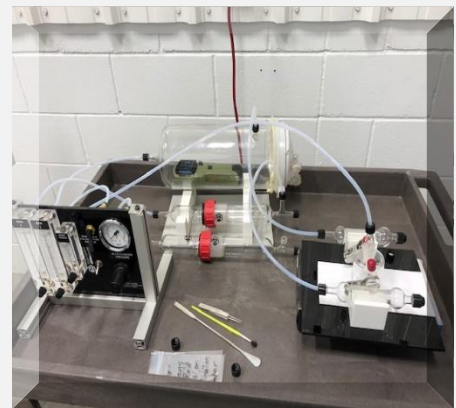
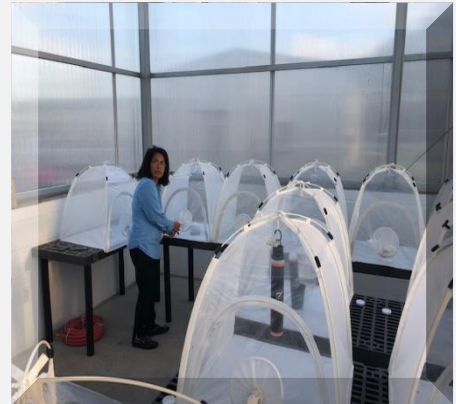


INSECTICIDES AND REPELLENT EVALUATIONS:

Ticks are considered as the second most dangerous vector of diseases, some of which are quite lethal. Currently contact mosquito repellents are used for protection against ticks with no information on the use of spatial repellents. A study was initiated to investigate the effectiveness of a spatial mosquito repellent (Portable mosquito repeller, Model MR300, Thermacell Repellents, Inc., Bedford, MA) on repelling ticks. The study was conducted in a modular wind tunnel (MWT) using as olfactometer and in a mini true choice olfactometer. In the wind tunnel, male and female adults were tested separately but there was no difference in their behavior. Thus, male and female adults were tested together in the true-choice olfactometer. Also, the nymphs were tested in the true-choice olfactometer. The results indicated that adults were partially repelled in the wind tunnel. In the true-choice olfactometer, adults were repelled significantly by thermacell but nymphs were not. The study was funded by Termacell Repellents Inc.

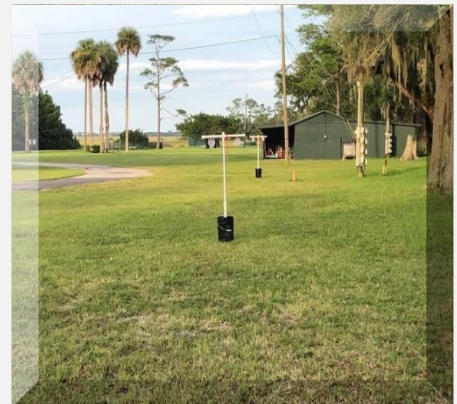
Different spatial repellent devices against adult mosquitoes were evaluated in outdoor screened enclosures. This is a collaboration project and funded by Light Farmer.

Visiting scientists Dr. Muhammad Miah and Dr. Shougang Zhang conducted studies to evaluate copper sulfate as a potential new larvicide. Copper sulfate is commonly used to clean sources of standing water, such as swimming pools and ponds, of algae and bacteria. To evaluate its effects, Dr. Miah tested different concentrations of a copper sulfate solution (SAFI) ranging from 5–100ppm against 3 different mosquito species: *Aedes aegypti*, *Culex quinquefasciatus* and *Anopheles quadrimaculatus*. His study demonstrated that even at concentrations as low as 4ppm, the product could kill nearly half of all larvae within three days. After this study, Dr. Zhang tested to see how long the copper sulfate persisted in water. To do this, he introduced larvae from 2 different species, *Ae. aegypti* and *Cx. quinquefasciatus*, into buckets and pools of treated water every 7 days for 3 weeks. This study found copper sulfate has long-lasting effects in water and can continue to kill mosquito larvae past 3 weeks.



DETERMINATION OF INFLUENCING FACTOR FOR ULV SPRAY AND ITS IMPACTS ON NON-TARGETS:

Dr. M. Farooq evaluated the efficacy of ultra-low volume (ULV) space sprays. Realizing inconsistencies in efficacy of truck mounted ULV space sprays, two studies were conducted to investigate the effect of nozzle orientation and travel speed on effectiveness of spray in the open field. The results indicated horizontal nozzle orientation to be the best and the efficacy increased with an increase in travel speed. During these studies, efficacy was checked at 5 ft above ground and indicated that spray was most effective when the nozzle orientation remained about 5 ft above ground. A study was conducted to evaluate spray dispersion at different heights and distances from the spray released at different orientations of the nozzle. Movement of Aqualuer 20-20 sprayed with a truck mounted ULV sprayer at the maximum label rate was tracked by bioassays and spray deposition at heights of 5, 10, 20 and 30 ft and distances of 0, 100, 200, and 300 ft from the spray line. This study was conducted in collaboration with US Navy Entomology Center of Excellence, Jacksonville, FL.

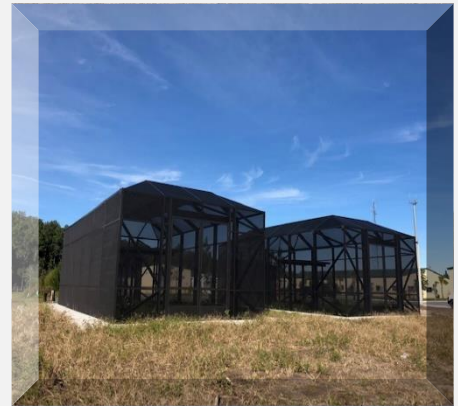


AMCD, UF, and the City of Gainesville Mosquito Control evaluated the effects of routine applications of barrier treatments and truck-based ultra-low volume (ULV) treatments on honey bees under conditions that reflect actual field exposure in Gainesville, Florida. Caged bees (*Apis mellifera*) and mosquitoes (*Aedes albopictus*) were directly exposed to bifenthrin (TalstarP®, AI 7.9%, FMC) as a barrier treatment at the maximum rate (1fl.oz./gallon). Laboratory leaf bioassay results show that 24-h mortality of bees and mosquitoes decreased as the leaf sample distance increased (0, 10 and 20 ft.) and also decreased over time (0, 1, 2 and 3 wk.). When bee hives were placed in a residential backyard (150 ft. from spray line) and exposed to permethrin (Aqua-Kontrol 30-30) via ULV application at the medium application rate of 0.00175 lbs /acre, no significant differences were observed in the number of dead bees per hive, mortality of caged bees and mosquitoes, and total weight of bees per hive between the treatment and control. Results suggest that different mosquito application techniques may have different effects on honey bee survivorship.



COLLABORATIVE, ONGOING, AND COMPLETED APPLIED RESEARCH PROJECTS FOR 2019

Semi-field evaluation of spatial mosquito repellent devices	Laboratory evaluation of ThermCell mosquito repellent against ticks
Semi-field evaluation of spatial repellent torches against mosquitoes	Irradiated female <i>Aedes aegypti</i> mosquitoes and Deet repellency
Field evaluation of In2Care trap and AGO trap comparisons	Evaluation of different infusion for gravid traps to collect gravid mosquitoes
Semi-field and field evaluation of three modified gravid traps against <i>Aedes</i> mosquitoes	Tolfenpyrad efficacy and resistance bioassay in the laboratory
Dyna Trap evaluation	Field evaluation of 6 adulticides on mosquitoes and honey bees
Laboratory bioassay of several new formulations of plant resource compounds against mosquito larvae	Semi-field and field evaluation of Rescue's sticky traps against eye gnats and <i>Aedes aegypti</i> mosquitoes
Laboratory and semi-field evaluation of a new larviciding against 3 species of mosquito larvae	Semi-field evaluation of ULV droplets in relation to cage heights
Semi-field evaluation of new formulation of malathion against adult mosquitoes	Keystone virus vector investigation in St. Johns County
Northeastern Florida EEE/WNV vector survey	Wolbachia-infected mosquito release in Southern St. Augustine
SIT male release evaluation in down town St. Augustine	Laboratory testing for the ATSB against resistant <i>Aedes aegypti</i>
SIT mosquitoes and ULV spray with permethrin products tested in the semi-field	SIT mosquitoes and ATSB testing against <i>Aedes aegypti</i> in the laboratory
Laboratory testing of the ATSB devices against 3 species of adult mosquitoes	ATSB device against <i>Aedes albopictus</i> tested in the laboratory and field

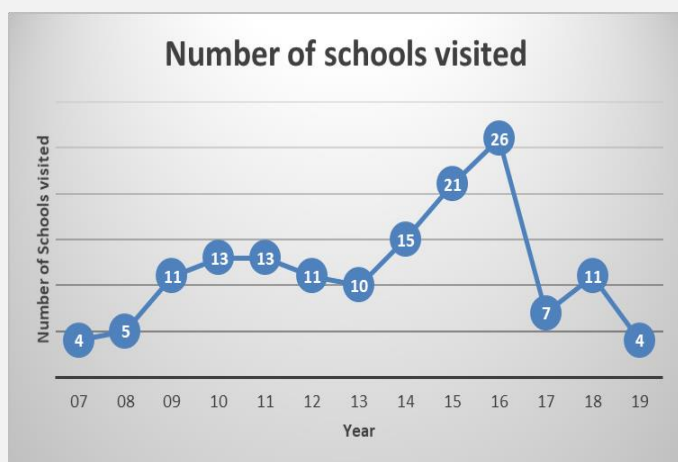


AMCD EDUCATION EVENTS AND TRAINING:

Dr. Efsthation hosted a mosquito identification training class at AMCD for all AMCD employees. AMCD employees also attended many training events including AMCA, AMCD's 16th Annual Arbovirus and Mosquito Control Workshop & receiving 18 CEU credits, Drone, FES, Larval ID Class, Subcommittee on Managed Marshes, FMCA, Dodd Short Courses, Pryor Management Classes, SOVE, FDACS ID Training at AMCD, First Aid & CPR, Hazardous Spill Response, Fly-In classes, USDA larval rearing, and the 5th Annual Biologist/Entomologist workshop. AMCD collaborated with UF and trained a Ph.D. student and AMCD trained 5 visiting scientists and 8 intern students. AMCD, as a mentor, provided training for the mentee, Gainesville Mosquito Control staff through the National Association of City and County Health Officer's CDC grant fund.



AMCD Mosquito ID Class



ST. JOHNS COUNTY SCHOOL PROGRAMS:

In 2019 AMCD taught at 4 different schools in St. Johns County, reaching 430 students. Participating Elementary schools included: Arc Community Campus, Otis Mason Elementary, Durbin Creek Elementary, and PVPV/Rawlings Elementary. AMCD also attended 5 summer camps giving presentation to around 400 children. The District was once again asked to judge the St. Johns County STEM Fair.

COMMUNITY EVENTS/PUBLIC OUTREACH:

AMCD was involved in 8 public events including FOCUS Hastings, National Night Out, Nocatee Night Out, Flagler Career Expo, Pink Up the Pace Expo, Vilano Beach Clean-up, Ancient City Kids Day, and the St. Augustine Christmas Parade. AMCD held an Open House on Thursday, June 27, 2019, from 4-7 PM, during the National Mosquito Control Awareness week and had 121 people who attended and also held an Open House for FMCA meeting participants on November 17, 2019. AMCD met with the St. Johns County School Board Curriculum directors to discuss curriculum needs and what AMCD could provide.

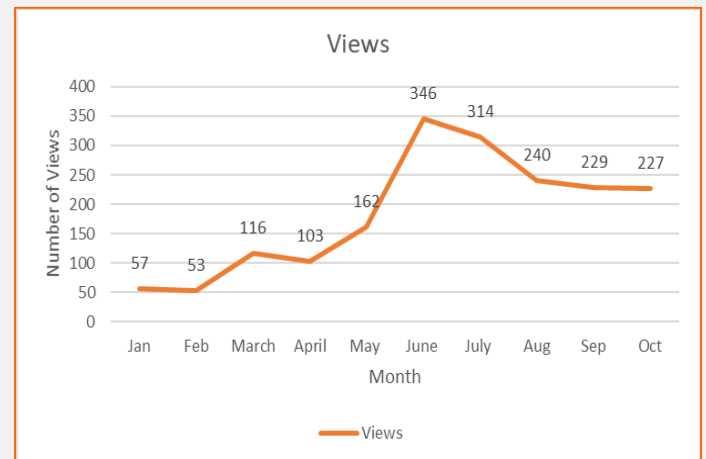
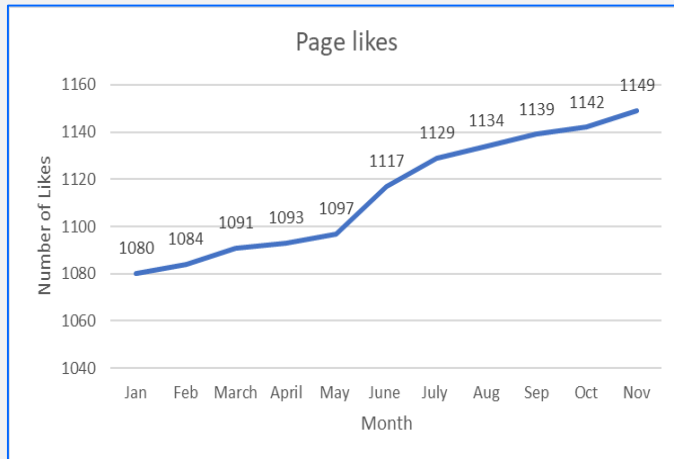


**Flagler
Career
Expo**

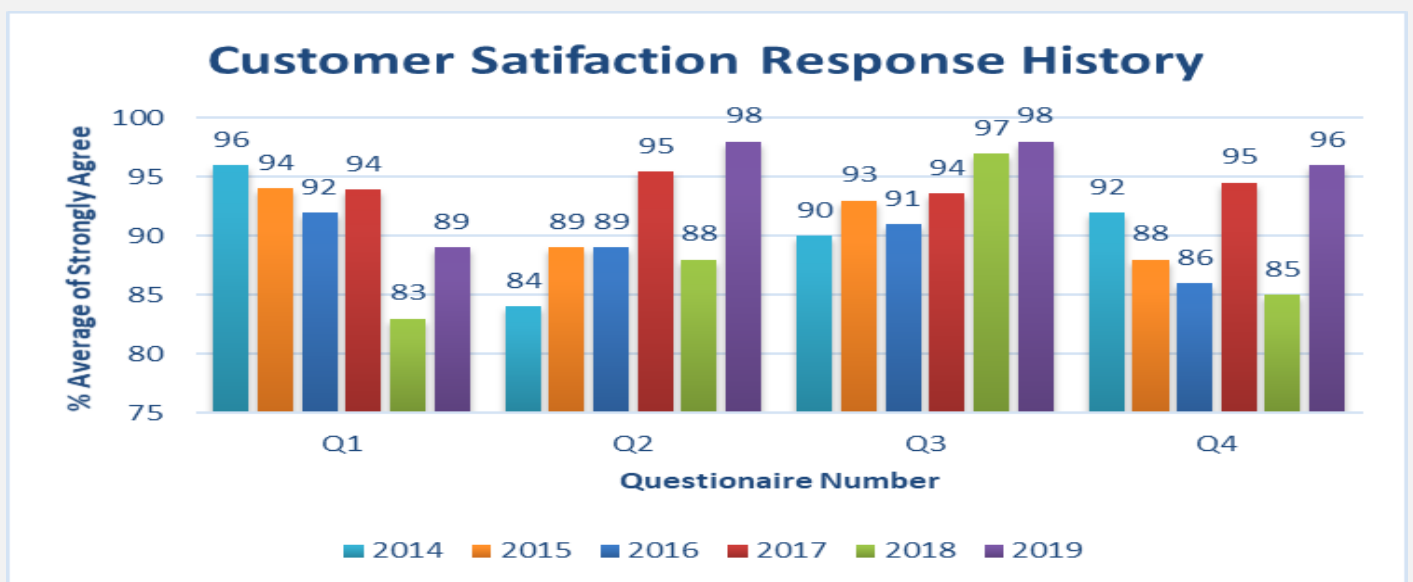
**St. Augustine
Christmas
Parade Float
(12-7-19),
engineered
& coordinated
by: Education
Specialist,
Edward Zeszutko**



PUBLIC RELATIONS: The District increased its presence on social media in 2019. The Anastasia Mosquito Control District's Facebook page now has over 1,000 followers and over 1,000 page likes. Post reach and reactions increased as well. In an effort to increase awareness of spray activity among St. Johns County residents, spray maps were created and published on the District's website. The District's social media following increased steadily throughout 2019. The District was featured in one TV news story and one radio appearance.



2019 CUSTOMER SATISFACTION SURVEY RESULTS: AMCD continues to gauge customer satisfaction using both physical and internet surveys. For 2019 there were 46 physical surveys returned and 4 internet surveys returned, for a total of 50 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.

- Jan 8-10: Mr. Paul Leone & Mr. Richard Weaver attended FMCA Fly In class in Lee County Mosquito Control District, Ft. Myers, FL
- Feb 4-7: Commissioner Jeanne Moeller organized the Dodd Short Course Commissioner Caucus and 12 employees attended various classes.
- Feb 7: Dr. Rui-De Xue attended the UF/EPI Research Day.
- Feb 12: AMCD hosted the FCCMC meeting.
- Feb 25-28: Commissioners' Gary Howell, Jeanne Moeller, and, Dr. Rui-De Xue and 4 employees (as volunteers) attended the AMCA annual meeting, Orlando, FL. Dr. Xue co-organized a symposium on the *Aedes* mosquito management and gave presentations. Dr. Xue received the Presidential Citation award, Mr. Christopher Bibbs received the student competition award.
- Mar 6: Mr. Steven Smoleroff & Mr. Morgan Duett attended the Salt Marsh Manager Committee meeting, Indian River Mosquito Control District, Vero Beach, FL.
- Mar 19: Dr. Rui-De Xue attended the FES Teleconference meeting.
- Mar 25-26: Commissioners' Jeanne Moeller & Trish Becker attended the FMCA Tallahassee Legislation meeting.
- Mar 26-28: AMCD hosted and organized the 16th Annual Workshop.
- Apr 4: AMCD held an Applied Research and Collaboration meeting.
- Apr 16-17: Dr. Rui-De Xue was invited to give a presentation on creating a mosquito control program at NACCHO, St. Pittsburgh, FL.
- Apr 17: Dr. Caroline Efstathion & Mrs. Dena Autry attended the FMCA Entomologist /Biologist meeting at Lee County Mosquito Control District, Ft. Myers, FL.
- Apr 23-24: AMCD hosted the NACCHO Representatives who visited the District.
- Apr 25: AMCD hosted the Kiwanis Club members who visited the District.
- May 7: Dr. Rui-De Xue teleconferenced in for the FCCMC meeting.
- May 14-15: Commissioner Jeanne Moeller and Dr. Rui-De Xue attended the AMCA DC Legislation meeting.
- May 27-30: Dr. Rui-De Xue as Conference President co-organized the 6th International Forum for surveillance and control of mosquitoes and vector-borne diseases in Xiamen, China.
- May 31: Dr. Rui-De Xue co-organized the ASVEMC & Taiwan Pest Control Assoc. Vector Control Workshop, Taipei, Taiwan.
- Jun 10-13: Dr. Rui-De Xue attended the Vector Control Response and WHO meeting, Netherlands.
- Jun 13: AMCD hosted the Florida Mosquito Control Association (FMCA) Board meeting.
- Jun 19: AMCD & DOH held an annual Collaboration meeting.
- Jun 27: AMCD held an Open House.



FES Meeting, Jupiter, FL

July 21-24, 2019

Asst. Supervisor, Mrs. Dena Autry and Molecular Biologist, Dr. Caroline Efstathion



- Jul 21: Dr. Rui-De Xue attended the Florida Entomology Society (FES) Board meeting, Jupiter, FL
- Jul 23: Dr. Caroline Efstathion and Mrs. Dena Autry attended the FES meeting and gave presentations at the symposium and presented a poster, Jupiter, FL.
- Aug 16: AMCD held an intern students and visiting scientists' presentation.
- Aug 23: AMCD held a visiting scientist presentation.
- Aug 27-29: Dr. Rui-De Xue was invited and partially funded for giving a presentation on mosquito species specific control to benefit non-targets, ASC's Symposium, San Diego, CA.
- Sep 17: Dr. Rui-De Xue attended the FCCMC meeting through teleconferencing in.
- Sep 23-25: Commissioners' Jeanne Moeller, Gary Howell & Dr. Rui-De Xue attended the SOVE annual meeting, San Juan, Puerto Rico
- Oct 7-11: Mrs. Dena Autry & Mr. Steven Smoleroff attended the UF/FMEL ID class, Vero Beach, FL
- Oct 25: AMCD held an intern students and visiting scientists' presentation for all employees.
- Oct 30-31: Commissioner Don Girvan and Dr. Rui-De Xue visited MosquitoMate, Lexington, KY.
- Nov 4-7: Dr. Rui-De Xue was invited and funded for giving a seminar on dengue vector control in the city of Jeddah, Saudi Arabia.
- Nov 17-20: AMCD held an Open House for FMCA participants and hosted the 91st FMCA Annual meeting and 25 people from AMCD attended the meeting and gave 13 presentations. Commissioner Jeanne Moeller organized the Commissioner Session at the AMCD facility.
- Dec 5: AMCD hosted the DACS/DPI visit and quarantine office for inspection.
- Dec 9-12: Dr. Rui-De Xue was invited & funded for giving a presentation about repellent testing standardization at the European Collaboration in Science and Technology's Nanotechnology for repellents meeting in Malta.
- Dec 18: Mrs. Kay Gaines attended the St. Johns County's Leadership Council meeting.

- Bibbs, C.S., J. R. Bloomquist, D. A. Hahn, R. D. Xue, and P. E. Kaufman. 2019. Investigations for reducing fitness in peridomestic mosquitoes using spatial repellents. 260th American Chemical Society Meeting: Division of Agrochemicals; Development of Novel Vector Control Technologies Symposium, Aug. 28, 2019.
- Smoleroff, S. T., C. S. Bibbs, and R. D. Xue. 2019. Evaluation of pyrethroid and botanical barrier insecticides against *Aedes albopictus* in the laboratory and field. 16th Arbovirus Surveillance and Mosquito Control Workshop; Attractant, Trap, and Repellent Symposium – Mar 27th, 2019
- Xue, R. D., S. Shi, J. Zhu, E. Khater, C. S. Bibbs, and D. Dixon. 2019. Evaluation of a novel rotator trap, modification to AGO traps with suction fans, and modifications to 00ZZZero traps. 16th Arbovirus Surveillance and Mosquito Control Workshop; Larval and Adult Control Symposium – Mar 27th, 2019.
- Acevedo, N., C. S. Bibbs, and R. D. Xue. 2019. Semi-field evaluation of three light traps against *Aedes aegypti*. 16th Arbovirus Surveillance and Mosquito Control Workshop; Attractant, Trap, and Repellent Symposium – Mar 27th, 2019
- Bibbs, C. S., P. Brown, and R. D. Xue. 2019. Impacts of bromeliad type and water level on *Aedes aegypti* egg deposition. 16th Arbovirus Surveillance and Mosquito Control Workshop; Biology & Ecology Symposium – Mar 27th, 2019.
- Dena Autry. 2019. Large-scale deployment of CDC/AGO traps for control of *Aedes* mosquitoes in 2018 ... , 16th Arbovirus Surveillance and Mosquito Control Workshop, AMCD, St. Augustine, FL, Mar. 27th, 2019.
- Richard Weaver. 2019. A new software for mobile phone application to improve customer service. 16th Arbovirus Surveillance and Mosquito Control Workshop, St. Augustine, FL, Mar. 28, 2019.
- Clark M. 2019. Overview of AMCD intern training program. 16th Arbovirus Surveillance and Mosquito Control Workshop, St. Augustine, March 28, 2019.
- Bibbs, C. S., J. R. Bloomquist, D. A. Hahn, R. D. Xue, and P. E. Kaufman. 2019. Characterization of volatile pyrethroids for mosquito management. University of Florida, Entomology and Nematology Dissertation Defense Seminar – March 22nd, 2019.
- Bibbs, C. S., P E. Kaufman, and R. D. Xue. 2019. From spatial repellent to harborage treatment adulticide: pilot tests of metofluthrin for point-source mosquito abatement. 85th American Mosquito Control Association Meeting; Student Paper Competition – February 27th, 2019.
- Bibbs, C. S. 2019. Highlights in Vector Control. 85th American Mosquito Control Association Meeting; 6th Arthropod Vector Highlights Symposium – February 26th, 2019.
- Bibbs, C. S., J. Hogsette, and D. L. Kline. 2019. Spatial repellents made easy: this potpourri smells funny. 36th Annual Florida Mosquito Control Association DODD Mosquito Control Workshops; A Potpourri of Potential Issues Facing Mosquito Control, Course Q – February 7th, 2019
- Bibbs, C. S., R. Perreira, and R. W. Baldwin. 2019. Mosquito taxonomy, biology, ecology, and vector relevance for mosquito control operations. 36th Annual Florida Mosquito Control Association DODD Mosquito Control Workshops; Commissioner Caucus, Course C – February 5th, 2019
- Xue, R.D. 2019. The past and future about the IFSCMVD-Presidential address. The 6th International Forum for Surveillance and Control of Mosquitoes and Vector-borne Diseases, Xiamen, China, May 26-30, 2019.
- Xue, R.D. 2019. Evaluation of two modified gravid traps and a novel rotated trap against adult mosquitoes. Environmental agents and vector management international workshop. May 31, 2019.
- Xue, R.D. 2019. Resurgence of *Aedes aegypti* and its control efforts at the Anastasia Mosquito Control District, Northeastern Florida. AMCA's 85th annual meeting, Orlando, FL, Feb 25-March 1, 2019.

- Dixon D, Mullin L, Autry D, Gaines MK, Banfield M, Xue RD. 2019. The mass deployment of autocidal gravid traps for the control of *Aedes aegypti* and *Ae. albopictus* in St. Johns County. AMCA's 85th Annual meeting, Orlando, FL, Feb 25-March 1, 2019.
- Autry D. 2019. AGO traps and In2Care trap comparison. 102nd Florida Entomology Society annual meeting, Jupiter, July 23, 2019.
- Efstathion C, 2019. Blood feeding behavior, 102nd Florida Entomology Society annual meeting, Jupiter, July 23, 2019.
- Xue, R.D. 2019. Species specific control techniques for control of *Aedes aegypti* and reducing impact on non-target organisms. American Chemical Society annual meeting. San Diego, CA, August 27, 2019.
- Xue, R.D. and K. Linthicum. 2019. Host avidity, blood feeding, and Deet repellency of irradiated *Aedes aegypti*. 49th Annual SOVE conference. San Juan, Puerto Rico, September 22-26, 2019.
- Xue, R.D. 2019. Seminar: Dengue vector control technology and AMCD's program. Department of Environmental Protection and Dept of Health, City of Jeddah, Saudi Arabia, Nov. 7, 2019.
- Weaver R. 2019. Overview of Anastasia Mosquito Control District's New Applied Research Facility. 91st annual meeting of the Florida Mosquito Control District, St. Augustine, FL, Nov 18-20, 2019.
- Miah, M. & K. Blore. 2019. Laboratory and field evaluation of a new larvicide against 3 species of mosquitoes. 91st Annual meeting of the FMCA. St. Augustine, FL, Nov. 18-20.
- Pearson, M. 2019. Laboratory evaluation of boric acid sugar baits against resistance strain of *Aedes aegypti*. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Zeszutko, E. 2019. Laboratory and field evaluation of commercial ATSB product against *Aedes albopictus*. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Aryaprema, V.S. and R.D. Xue. 2019. Semi-field evaluation of ULV spray of Aqualuer 20-20 against irradiated *Aedes aegypti*. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Qualls, W.A. 2019. Enhancing resources and capacity of entities that do mosquito control in Texas. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Efstathion, C. 2019. Gravid infusion water comparison for collection of *Aedes* mosquitoes. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Cunningham, C.A. 2019. Sub-lethal effects of irradiation on the blood feeding behavior of *Aedes aegypti* in St. Augustine, FL. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Bangonan L. 2019. Trap modification to increase the capture rate of *Aedes aegypti*. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Farooq, M. & R.D. Xue. 2019. Testing repellents for ticks. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Smoleroff, S. 2019. Mosquito population surveillance at St. Johns County, Florida in 2019. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Khater, E. & D. Autry. 2019. Field efficacy comparison between In2Care traps and AGO traps against *Aedes* mosquitoes in St. Augustine. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Xue, R.D. 2019. Host avidity and deet repellency in irradiated *Aedes aegypti*. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.
- Xue, R.D. 2019. Overview of AMCD's programs. Commissioner Session. 91st Annual Meeting of the FMCA, St. Augustine, FL, Nov. 18-20, 2019.

1. Zhu D, Khater EIM, Chao S, Dixon D, Bibbs CS, Xue RD. 2019. Modifying the autocidal gravid ovitrap (AGO) with a powered suction fan and additional lures to increase the collection of *Aedes aegypti* and *Ae. Albopictus* (Diptera: Culicidae). *Journal of Vector Ecology*, 44(2): 282-284.
2. Bibbs CS, Shirley K, Autry DL, Xue RD. 2019. Semi-field ULV evaluation of an all-purpose botanical insecticide containing cedarwood and cinnamon oils. *Journal of the Florida Mosquito Control Association*, 66: 54-59.
3. Smoleroff ST, Bibbs CS, Xue RD. 2019. Evaluation of five outdoor residual insecticides against *Aedes albopictus* in St. Augustine, Florida. *Journal of the Florida Mosquito Control Association*, 66: 47-53.
4. Bibbs CS, Crosier JE, Xue RD, Müller GC, Qualls WA. 2019. *Aedes aegypti* (L.) survivorship on salt tolerant California landscape plants. *Journal of the Florida Mosquito Control Association*, 66: 7-10.
5. Brown PT, Clark ME, Bibbs CS, Xue RD. 2019. *Aedes aegypti* (L.) oviposition differences among ornamental bromeliads with variable water levels. *Journal of the Florida Mosquito Control Association*, 66: 1-6.
6. Bibbs CS, Kline JD, Kline DL, Estaver J, Strohschein R, Allan SA, Kaufman PE, Xue RD, Batich CD. 2019. Olfactometric comparison of the volatile insecticide, metofluthrin, through behavioral responses of *Aedes albopictus* (Diptera: Culicidae). *Journal of Medical Entomology*, 56(6): 1-8.
7. Luo L, Xue RD, Bibbs CS. 2019. Efficacy evaluation of the mixture of permethrin and (s)-methoprene applied by a backpack sprayer against larval and adult *Culex quinquefasciatus*. *Acta Parasitology et Medica Entomologica Sinica*, 26(2): 92-98.
8. Bibbs CS, Bloomquist JR, Hahn DA, Kaufman PE, Xue RD. 2019. Gone in 60 seconds: sub-lethal effects of metofluthrin vapors on behavior and fitness of resistant and field strains of *Aedes aegypti* (Diptera: Culicidae). *Journal of Medical Entomology*, 56(4): 1087-1094.
9. Liu H, Dixon D, Bibbs CS, Xue RD. 2019. Autocidal Gravid Ovitrap (AGO) incorporation with attractants for control of gravid and host-seeking *Aedes aegypti* (Diptera: Culicidae). *J Med Entomol*, 56(2): 576-578.
10. Ledesma, NA, Kaufman, PE, Xue, RD, Leyen, C, Macapagal, MJ, Winokur, OC, Harrington, LC. 2019. Entomological and sociobehavioral components of heartworm (*Dirofilaria immitis*) prevalence in two Florida Communities with a high or low prevalence of dogs with heartworm infection. *J Am Vet Med Assoc* 254:93-103.
11. Shi C, Zhu D, Dixon D, Khater E, Xue RD. 2019. Diel activity patterns of adult female mosquitoes (Diptera: Culicidae) determined by a novel rotated trap in Northeastern Florida, USA. *JVE* 44:149-153.
12. Khater E, Zhu D, Xue RD. 2019. Semi-field evaluation of modified 00 ZZZero traps with stick paper to increase the collection efficacy of gravid *Aedes aegypti*. *JAMCA* 35:137-139.

13. Sissoko F, Junnila A, Traore, MM, Traore SF, Doumbia S, Dembele SM, Schlein Y, Traore AS, Gergely P, **Xue, RD**, Arheart KL, Revay EE, Kravchenko VD, Beier JC, Muller GC. 2019. Frequent sugar feeding behavior by *Aedes aegypti* in Bamako, Mali makes them ideal candidates for control with attractive toxic sugar baits (ATSB), PloS One 14(6):e214170. <https://doi.org/10.1371/journal.pone.0214170>
14. Kulkarni A, Yu Wq, Jiang JJ, Sanchez C, Karna AK, Martinez KJL, Hanley KA, Buenemann M, Hansen IA, **Xue RD**, Ettestad P, Melman S, Duguma D, Debboun M, Xue JN. 2019. *Wolbachia pipiens* occurs in *Aedes aegypti* populations in New Mexico and Florida, USA. Ecology and Evolution. 9:6148-6156.
15. Aryaprema VS, **Xue RD**. 2019. Breteau index as a promising early warning signal for dengue fever outbreaks in the Colombo District, Sri Lanka. Acta Tropica 199:150-155.
16. Traore MM, Junnila A, Revay EE, Kravchenko VD, Lahti A, Fiorenzano JM, Cott JM, Qualls WA, Kline DL, Schlein Y, Beier JC, **Xue RD**, Muller GC. 2019. Control of adult and larval *Aedes albopictus* with attractive toxic sugar baits (active ingredient: cinnamon-sesame oil) in Northeastern Florida, JFMCA 66:20-26.
17. Dixon D, Autry D, **Xue RD**. 2019. Evaluation of multiple trap types for the capture of vectors of Eastern Equine Encephalitis virus in Saint Johns County, Florida. JFMCA 66:11-19.
18. Dixon D, D'Amato J, **Xue RD**. 2019. Evaluation of CDC light trap, BG sentinel trap, and MMX trap for the collection of salt marsh mosquitoes in Anastasia State Park, Saint Augustine, Florida. JFMCA 66:64-67.
19. **Xue RD**, Tsikolia M, Qualls WA, Bernier U. 2019. Store time of permethrin in the truck-mounted ULV spray tanks caused degradation in the concentrations. JFMCA 66:60-63.
20. Luo L, Gaines MK, **Xue, RD**. 2019. Evaluation of a new truck-mounted ULV spraying machine with *Bacillus thuringiensis israelensis* against larval *Culex quiquefasciatus*. JFMCA 66: 73-79.
21. Sanchez-Arroyo H, Pereira RM, Jiang YX, **Dixon D**, **Xue RD**, Koehler PG. 2019. Laboratory toxicity of mosquito adulticides to the Asian tiger mosquitoes, *Aedes albopictus* and the honey bees, *Apis mellifera*. JFMCA 66:40-46.
22. Aryaprema VS, **Xue RD**. 2019. Effectiveness and public acceptance of a slow release formulation of *Bacillus thuringiensis israelensis* (Mosquito Dunks®) in controlling the population density of dengue vectors in Sri Lanka. International Journal of Pest Control
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24. **Xue RD**. 2019. 2016-2017 FMCA presidential address: What is next for potential outbreaks of mosquito-borne diseases, JFMCA 66:IV-VI.

ANNUAL PROGRAM REPORT

COMMITTEE MEMBERS



Top Row: Mr. Richard Weaver (Business Manager), Mrs. Marcia Kay Gaines (Operations Manager), Ms. Charolette M. Hall (Administrative Assistant), *Middle Row:* Mr. Edward Zeszutko (Education Specialist), Dr. Rui-De Xue, Director, Mrs. Dena Autry (Assistant Supervisor), *Bottom Row:* Mr. Scott Hanna (Accountant), Dr. Whitney Qualls, (Entomologist/Scientific Manager), Dr. Caroline Efstathion, (Molecular Entomologist).

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 help in 2019.