MOSQUITO SURVEILLANCE 2018

GEORGIA DEPARTMENT OF PUBLIC HEALTH, ENVIRONMENTAL HEALTH

Mosquito Surveillance 2018

Limited mosquito surveillance programs occur in many Georgia counties (http://www.gamosquito.org/resources/GA_Mosquito_Control_Programs2017.pdf), but most counties with mosquito control programs conduct control activities without appropriate mosquito surveillance. Data obtained from mosquito surveillance activities are important to guide vector control operations by identifying vector species, providing an estimate of vector species abundance, and by indicating geographic areas where humans and animals are at greatest risk of exposure to WNV or other arboviruses.

Our goals for the 2018 mosquito surveillance season included doing some level of mosquito surveillance in every county in Georgia, continuing to provide equipment and training to Environmental Health Specialists in all 18 Public Health Districts, and having the ability to support local outreach for mosquito complaints. The accomplishment of these goals will allow the Georgia Department of Public Health to be better prepared for the next mosquito-borne disease to emerge.

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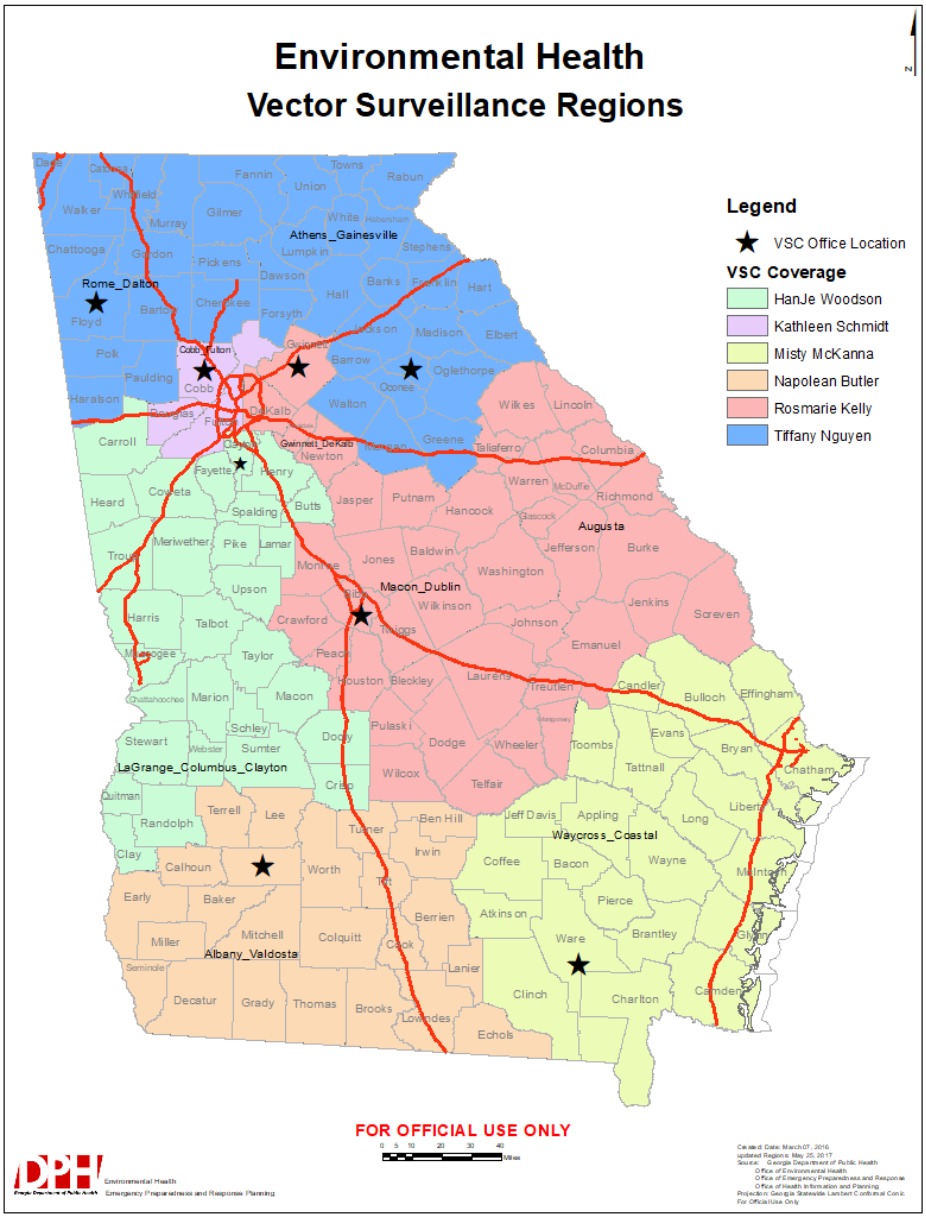
Overview

The Vector Surveillance Coordinator (VSC) program continued in 2018 with some personnel change. Also, in addition to mosquito surveillance, the VSCs were also involved in collecting mosquito eggs for statewide pesticide resistance testing.



OVERVIEW

Non-VSC Districts

Not all Health Districts are assigned a VSC. These Districts (1-1, 1-2, 2-0, 3-4, 3-5, 5-1, 5-2, 6-0, and 10-0) were assigned to the State Entomologists, Dr. Thuy-vi Thi Nguyen and Dr. Rosmarie Kelly. However, some of these Districts already had in-house or contracted mosquito surveillance programs, and some of them had an Environmental Health Director or Environmental Health Specialists (EHS) who had an interest in doing mosquito surveillance within their District or county.

The maps (FIG 1) used in this document were all created in January 2019. They depict the month(s) in which surveillance was done in each county and the presence or absence of the important vector species *Aedes aegypti*, *Ae albopictus*, *Culiseta melanura*, *Culex* spp, *Cx nigripalpus*, *Cx quinquefasciatus*, *Cx restuans*, *Cx salinarius*, and *Ochlerotatus triseriatus*. All species trapped are listed in a table for each District by county.

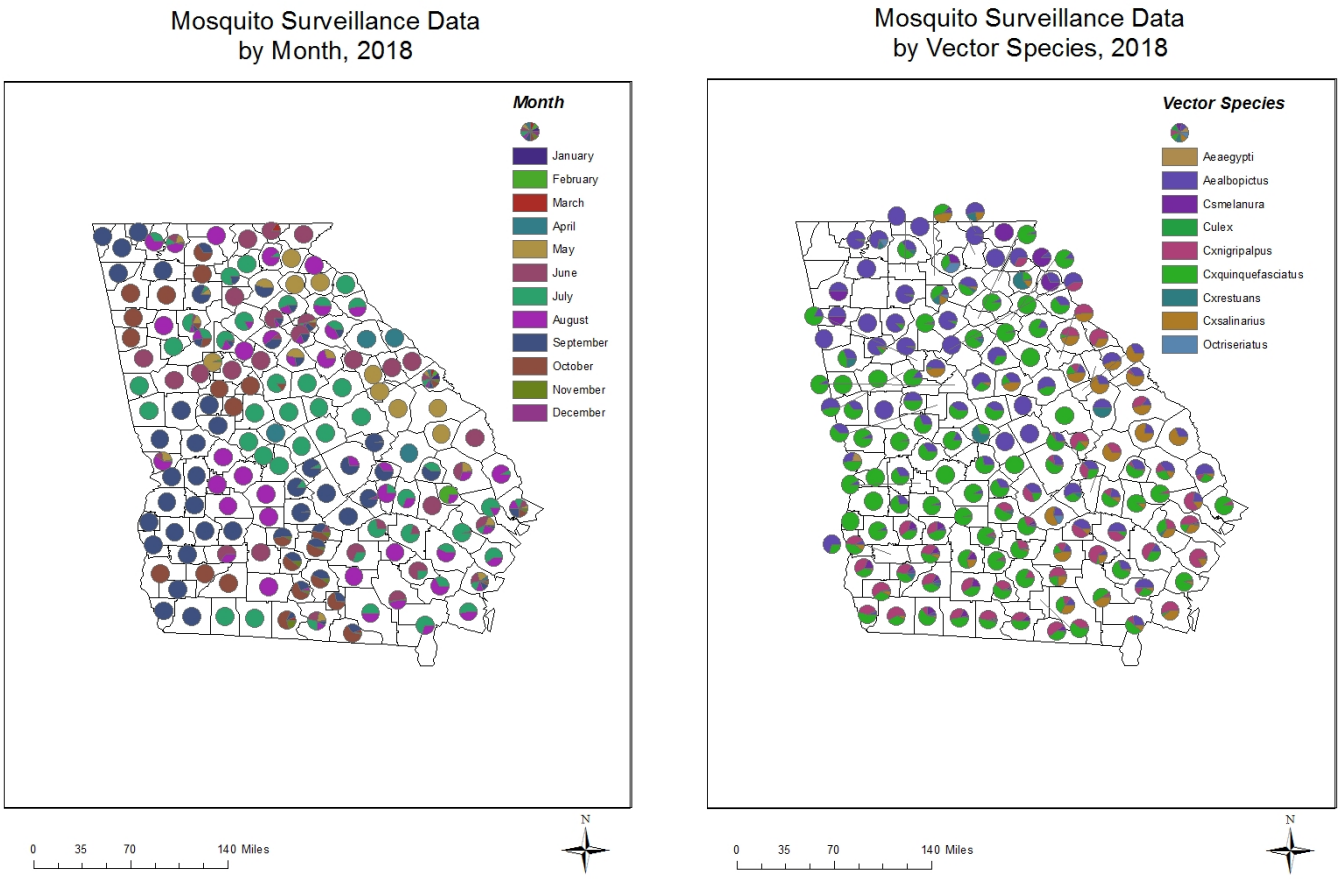


FIGURE 1: MOSQUITO SURVEILLANCE, GEORGIA 2018

OVERVIEW

Surveillance

Adult mosquito monitoring is a necessary component of surveillance activities and is directed toward identifying where adults are most numerous. This information drives response to service requests and helps determine whether interventions (source reduction, larviciding, and/or adulticiding) are effective.

There are a variety of different mosquito traps, but generally two different types of traps are used. One type, a gravid trap, selectively attracts container- breeding mosquitoes that have had a blood meal and are looking for a place to lay eggs. The other type, a light trap, attracts mosquitoes looking for a blood meal. Recently, a third type of trap, the BG-Sentinel trap has been used in areas where exotic arbovirus cases have been detected. This trap is very specific for the ZIKV, CHIK, and DEN vectors, *Ae aegypti* and *Ae albopictus*. With all three traps, as the mosquito gets close, it gets suctioned into the trap by a small fan. Mosquitoes caught in these traps are counted and identified. They may also be pooled according to date, species, and location and sent to a lab for testing.

Most of the surveillance and mosquito identification was done by the Vector Surveillance Coordinator (VSC) and the two GDPH entomologists, as well as by Environmental Health Specialists (EHS) in the non-VSC Districts.

GRAVID TRAP

This trap selectively attracts container-breeding mosquitoes that lay eggs in stagnant organically rich water. These mosquitoes will have had at least one blood meal, so may possibly have picked up an infected blood meal if there are arbovirus-positive enzootic hosts in the area.

LIGHT TRAP

Light traps attract mosquitoes looking for a blood meal. The attractants used are light and CO_2, in the form of dry ice or as compressed gas in canisters. These traps are useful for providing information about the mosquito species found in the area under surveillance. Because they attract mosquitoes looking for a blood meal that may have just emerged and never had a blood meal previously, the likelihood of finding virus in these mosquitoes is much reduced.

OVERVIEW

BG SENTINEL TRAP

What makes the BG-S trap different? It:

- Mimics convection currents created by a human body
- Employs attractive visual cues
- Releases artificial skin emanations through a large surface area
- Can be used without CO2 to specifically capture selected mosquito species

Used in combination with the BG-Lure, a dispenser which releases a combination of non-toxic substances that are also found on human skin (ammonia, lactic acid, and caproic acid), the BG-Sentinel trap is especially attractive for the yellow fever (or ZIKV) mosquito, *Aedes aegypti*, the Asian tiger mosquito, *Aedes albopictus*, the southern house mosquito, *Culex quinquefasciatus*, and selected other species.

With the addition of carbon dioxide, the BG-Sentinel trap is an excellent surveillance tool for mosquitoes in general.

MOSQUITO BREEDING HABITAT TYPES

There are two general categories within which mosquito breeding habitats exist: natural mosquito breeding habitats and man-made mosquito breeding habitats. Female mosquitoes lay their eggs either on water or on soils that are periodically flooded. These breeding areas can be found in habitats that exist naturally, such as within a pond or flood plain, or in habitats that have been created by humans, such as bird baths, water-filled tires, or catch basins. Mosquitoes can breed in a wide variety of locations, and the discussion below provides a description of the general types of habitats where mosquitoes are known to breed.

NATURAL MOSQUITO BREEDING HABITATS

Temporary Woodland Pools:

Shallow, temporary pools are common in woodland areas during the spring and wet summers in low lying areas or in small depressions where a variety of mosquito species will breed, most commonly *Ochlerotatus canadensis* and *Aedes vexans*. These mosquitoes lay their eggs along the edges of the pool and when rainwater or melting snow fills these pools the larvae hatch.

Freshwater Ponds:

The larvae of Anopheles are found primarily in small ponds among the emergent vegetation. Ponds clogged with vegetation can breed large numbers of mosquitoes because of the vast amounts of organic matter available to mosquito larvae for feeding and because fish and other aquatic predators cannot readily feed on the larval mosquitoes.

Streams and Floodplains:

Streams with running water rarely produce mosquitoes. However, mosquitoes need to be near water in order to lay their eggs. Anopheles and Culex mosquitoes are two types of species that can sometimes be found in isolated pockets adjacent streams or within floodplain areas that undergo only periodic flooding.

Tree Holes and Other Natural Containers:

Tree holes and other natural containers, such as pitcher plants or water trapped in or on plant leaves, can also serve as breeding habitats for mosquitoes, such as *Ochlerotatus triseriatus*. Frequent rainfalls maintain standing water within these types of microhabitats and can breed mosquitoes throughout the summer.

Freshwater Marshes and Swamps:

Mosquitoes, such as *Coquillettidia perturbans*, breed in freshwater marshes and swamps consisting of emergent vegetation. These types of habitats can occur in both woodland and open field habitats. Larvae attach themselves to the stems and roots of the vegetation to obtain oxygen, and do not need to swim up and down in the water column to feed and to breath. Due to this adaptation, these larvae can avoid exposure to predatory fish.

MAN-MADE MOSQUITO BREEDING HABITATS

Stormwater/Wastewater Detention:

A catch basin typically includes a curb inlet where storm water enters the basin to capture sediment, debris and associated pollutants. Similarly, detention/retention basins that perform similar functions for other types of wastewaters, such as waste treatment settlement ponds, provide a similar type of breeding habitat to that of the storm water catch basin. These detention basins provide breeding habitat for urban mosquito species, such as *Culex quinquefasciatus*. Moisture and organic debris captured within the detention basin can aid in development and provide nutrients for growing larvae.

Roadside Ditches:

OVERVIEW

Roadside ditches are the suitable habitat for many species of Culex mosquitoes. The larvae of *Culex quinquefasciatus* and *Culex restuans*, for example, can survive in waters with high organic content. Culex mosquitoes will lay their eggs directly on the water's surface; therefore, ditches that hold water for extended periods of time can breed large numbers of mosquitoes.

Artificial Containers:

Artificial containers left out to collect rainwater such as tires, bottles, buckets, and birdbaths can provide an excellent mosquito-breeding habitat free from any predators. Many tree-hole mosquitoes have learned to adapt to using these man-made mosquito nurseries. *Aedes albopictus*, our most common pest species, also breeds readily in these artificial containers. The abundance of organic debris, which can also collect in these containers, allows for the proliferation of mosquito breeding during a season.

Control – A Message for the Public

The mosquitoes of most importance to public health in Georgia are *Culex quinquefasciatus*, the Southern house mosquito, and *Aedes albopictus*, the Asian tiger mosquito. Both these species lay eggs in such artificial containers as birdbaths, gutters, tires, flowerpots, and any other container that holds water for at least a week. The Southern house mosquito prefers organically polluted water for laying its eggs, and bites at dusk. It feeds primarily on birds, but will bite mammals, and is our primary vector for WNV. The Asian tiger mosquito prefers cleaner water for laying its eggs, and bites during the day. It feeds primarily on mammals. It has been found positive for WNV in Georgia and is a vector of ZIKV.

The best way to control these species is to dump out or treat standing water, treat catch basins with larvicide, and to cut back heavy vegetation where the mosquito will rest when not out biting. These mosquitoes will shelter in abandoned houses. Thermal fogging or barrier spray around these houses can help to reduce resting and overwintering mosquitoes. Two larvicides are available to the public for treating standing water, Mosquito Torpedoes (methoprene) and Mosquito Dunks (Bti). Both are available online, and from Home Goods or Hardware Stores, and occasionally from large chain Pet Stores. Hand-held foggers can also be used to reduce biting populations of mosquitoes, but this solution is temporary and needs to be followed up with good source reduction (removing breeding sites) and larviciding.

OVERVIEW

NOTE: Is it *Aedes*, or is it *Ochlerotatus*?

Ochlerotatus had been originally established as a genus in 1891. It became an aedine subgenus in the 1930s, but in 2000 John Reinert and his colleagues elevated the subgenus *Ochlerotatus* back to a genus based upon microscopic differences in the male genitalia between it and other subgenera of *Aedes*. However, in 2005 the *Journal of Medical Entomology* and the Entomological Society of America decided to put *Ochlerotatus* back to subgenera level (http://www.entsoc.org/Pubs/Periodicals/JME/mosquito_name_policy). After a contentious worldwide debate regarding the effect the taxonomic changes would have on names established over decades of work in scientific, government and lay communities, many scientists (including those at the CDC) and others affected by the change espoused the continued use of the previously established names. So, for the time being, everything is *Aedes* again.

HOWEVER, since the GDPH mosquito surveillance database was established after *Ochlerotatus* was elevated to genus status, we appreciate you continuing to use *Ochlerotatus* to make data access easier.

Aedes

- *Ae. aegypti*
- *Ae. albopictus*
- *Ae. cinerius*
- *Ae. vexans*

Ochlerotatus

- *Oc. atlanticus/tormentor*
- *Oc. atropalpus*
- *Oc. canadensis*
- *Oc. dupreei*
- *Oc. fulvus pallens*
- *Oc. hendersoni*
- *Oc. infirmatus*
- *Oc. japonicus*
- *Oc. mathesoni*
- *Oc. mitchellae*
- *Oc. sollicitans*
- *Oc. sticticus*
- *Oc. taeniorhynchus*
- *Oc. thibaulti*
- *Oc. triseriatus*
- *Oc. trivittatus*

DATA BY DISTRICT

Data by District

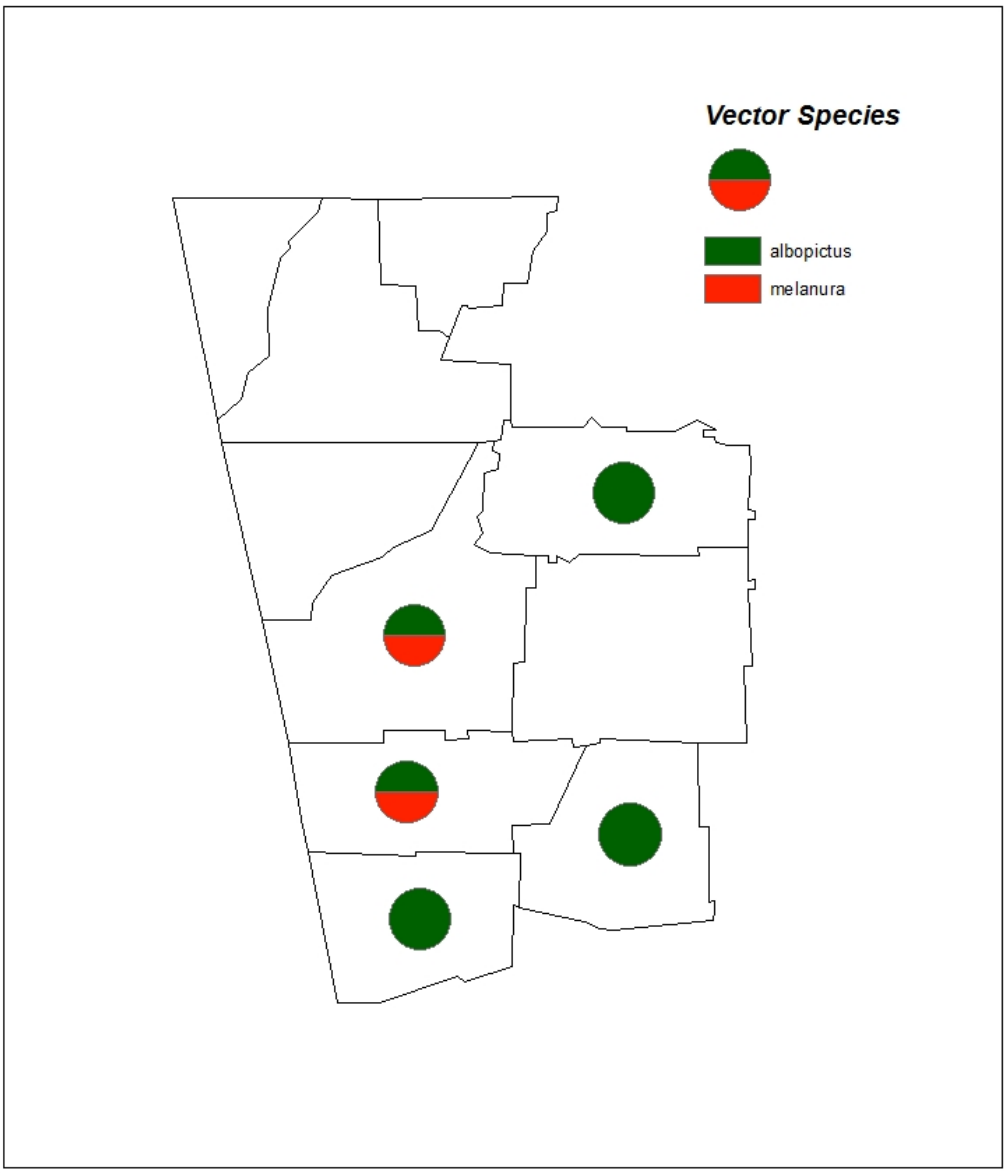
District 1-1

		trap type		
County	**Species**	**BGS**	**CDC**	**gravid**
Bartow	*Ps. columbiae*		2	
Catoosa	*Culex spp.*		3	
	Culex spp. (male)		1	
Chattooga	*Culex spp.*		10	
	Culex spp. (male)		2	
Dade	*Culex spp.*		11	
Floyd	*Ae. albopictus*		1	
	Ae. vexans		6	
	Cs. melanura		1	
	Culex spp.		1	
	Oc. trivittatus		1	
Gordon	*Ae. albopictus*		2	
	Culex spp.		7	
	Ps. ferox		8	
Haralson	*Ae. albopictus*		1	
Paulding	*Ae. albopictus*		9	
	Oc. japonicus			2
	Ps. ferox	1		
Polk	*Ae. albopictus*		2	
	An. punctipennis		1	
	An. quadrimaculatus		2	
	Cs. melanura		2	
	Cx. erraticus		1	
	Oc. atlanticus		2	
	Ur. sapphirina		1	
Walker	*Culex spp.*		20	
	Culex spp. (male)		2	
	Ps. ferox		1	

Surveillance in District 1-1 was done by local EHS with the assistance of one of the VSCs. Surveillance was done in August, September, and October over 10 trap nights.

DATA BY DISTRICT

Mosquito Surveillance Data, 2018



DATA BY DISTRICT

District 1-2

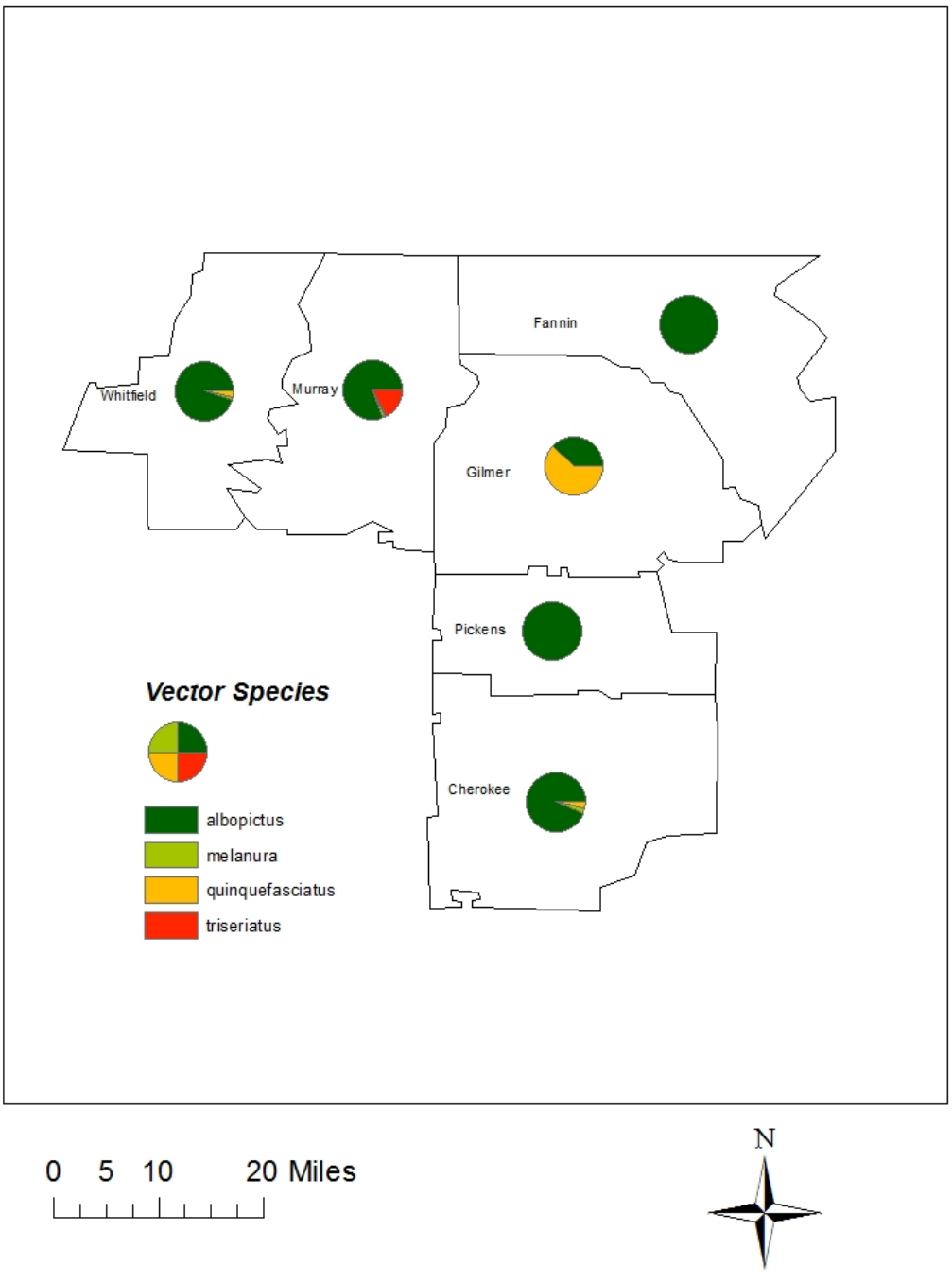
District 1-2		trap type	
County	**Species**	**CDC**	**other**
Cherokee	*Ae. albopictus*	110	
	Ae. vexans	41	
	An. crucians	2	
	An. punctipennis	44	
	Cs. melanura	3	
	Cx. erraticus	12	
	Cx. quinquefasciatus	4	
	Cx. territans	6	
Fannin	*Ae. albopictus*	742	
	Ae. cinereus	1	
	Aedes/Ochlerotatus spp.		1
Gilmer	*Ae. albopictus*	3	
	Cx. quinquefasciatus	5	
	Cx. restuans	1	
Murray	*Ae. albopictus*	72	
	Ae. albopictus (male)	9	
	Ae. cinereus	7	
	Ae. vexans	77	
	Ae. vexans (male)	8	
	An. crucians	5	
	An. punctipennis	21	
	An. punctipennis (male)	1	
	An. quadrimaculatus	1	
	Cs. melanura	1	
	Cx. erraticus	3	
	Cx. quinquefasciatus	1	
	Cx. quinquefasciatus (male)	1	
	Cx. restuans	11	
	Cx. territans	29	
	Oc. atlanticus	9	
	Oc. canadensis	1	
	Oc. japonicus	53	
	Oc. japonicus (male)	2	

Surveillance in District 1-2 was done by local EHS with the assistance of one of the VSCs. Surveillance was done from April - Oct over 39 trap nights.

	Oc. sollicitans	3	
	Oc. triseriatus	15	
	Oc. trivittatus	88	
	Ps. ciliata	21	
	Ps. columbiae	2	
	Ps. cyanescens	17	
	Ps. ferox	1	
	Ur. sapphirina	44	
	Ur. sapphirina (male)	38	
Pickens	*Ae. albopictus*	2	
Whitfield	*Ae. albopictus*	59	
	Ae. albopictus (male)	12	
	Ae. vexans	26	
	An. punctipennis	12	
	An. quadrimaculatus	3	
	Cs. melanura	1	
	Cx. erraticus	63	
	Cx. quinquefasciatus	2	
	Oc. atlanticus	33	
	Oc. fulvus pallens	9	
	Oc. infirmatus	2	
	Oc. japonicus	2	
	Oc. trivittatus	1	
	Ps. ciliata	5	
	Ps. columbiae	53	
	Ps. cyanescens	5	

DATA BY DISTRICT

Mosquito Surveillance Data, 2018



DATA BY DISTRICT

District 2-0

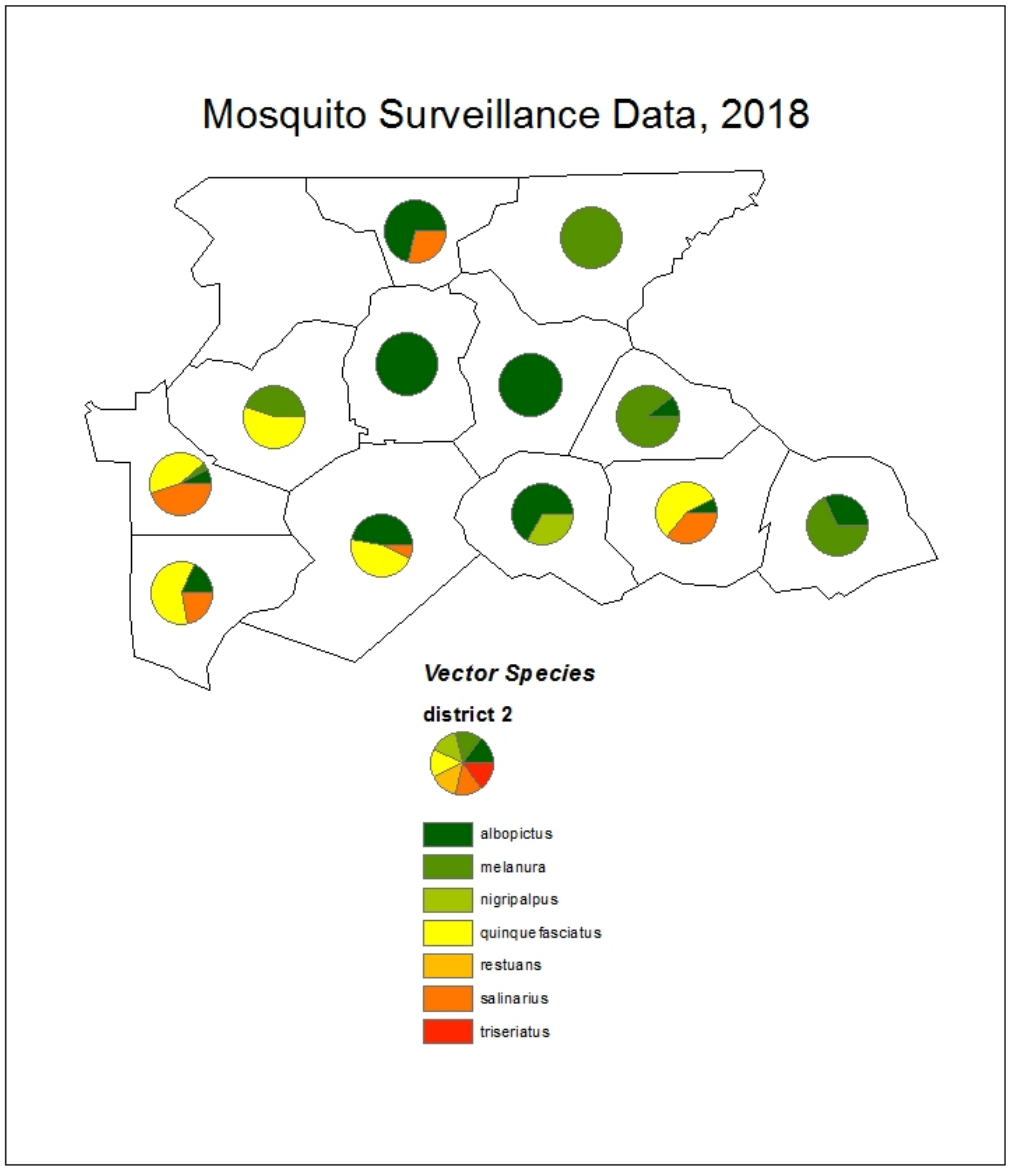
District 2-0		trap type	
County	**Species**	**CDC**	**gravid**
Banks	*Ae. albopictus*		2
	Ae. vexans		3
	An. crucians	2	
	Culex spp.		1
	Cx. nigripalpus	1	
	Oc. japonicus		1
Dawson	*Ae. albopictus*		4
	An. punctipennis	7	
	An. quadrimaculatus	5	
	Anopheles spp.	3	
	Cs. melanura	2	
	Culex spp.	74	14
	Cx. coronator	7	
	Cx. erraticus	2	
	Cx. quinquefasciatus	13	9
	Cx. salinarius	15	8
	Cx. territans	3	2
	Oc. japonicus	2	4
	Oc. mitchellae	3	
	Oc. sollicitans	1	
Forsyth	*Ae. albopictus*	2	3
	Ae. vexans	4	
	An. punctipennis	3	
	Cx. erraticus		3
	Cx. quinquefasciatus		16
	Cx. restuans		5
	Cx. salinarius		6
	Oc. canadensis	1	
	Oc. japonicus		7
	Oc. sollicitans	7	12
	Oc. triseriatus		3
	Oc. trivittatus		1
Franklin	*Ae. albopictus*	4	

Surveillance in District 2-0 was done by local EHS. Surveillance was done in March and from May-Sept over 19 trap nights.

	Ae. cinereus	2	
	Ae. vexans	101	
	An. crucians	21	
	Cq. perturbans	13	
	Cs. inornata	4	1
	Culex spp.	17	
	Cx. coronator	9	
	Cx. erraticus	27	
	Cx. quinquefasciatus	30	
	Cx. restuans	86	
	Cx. salinarius	19	
	Oc. japonicus	3	6
	Oc. sollicitans	3	
	Oc. taeniorhynchus	4	
	Ps. ciliata		1
	Ps. columbiae	1	
	unknown	17	
	Ur. sapphirina	1	
Habersham	*Ae. albopictus*	3	
	Ae. vexans	3	
	An. crucians	2	
	An. punctipennis	2	
Hall	*Ae. albopictus*	4	3
	An. crucians		2
	An. punctipennis	1	
	An. quadrimaculatus		1
	Cx. erraticus		7
	Cx. quinquefasciatus		7
	Cx. restuans	1	
	Cx. salinarius	1	
	Oc. japonicus		2
	Ps. columbiae	3	1
	Ps. cyanescens	3	2
Hart	*Ae. albopictus*		7
	An. crucians	1	
	Cs. melanura	15	
	Oc. japonicus		1

	Ps. ciliata	3	
Lumpkin	*Ae. vexans*		5
	Cs. melanura		4
	Cx. quinquefasciatus	2	3
	Cx. territans	1	
	Oc. japonicus		9
	Oc. triseriatus		5
Rabun	*Ae. vexans*	2	
	An. punctipennis	1	
	Cs. melanura	4	
	Culex spp.		10
	Cx. erraticus	1	
	Oc. japonicus		5
	unknown	2	2
Stephens	*Ae. albopictus*	3	1
	An. quadrimaculatus	1	
	Cs. melanura	28	5
	Culex spp.	2	
Towns	*Ae. albopictus*	2	3
	Ae. atropalpus	2	
	Ae. vexans		1
	Cx. restuans		2
	Cx. salinarius	2	
	Ps. cyanescens		1
Union	*Cx. erraticus*	2	1
	unknown	1	
White	*Ae. albopictus*	66	8
	Ae. vexans	3	
	Oc. sollicitans	2	
	Oc. triseriatus	1	

DATA BY DISTRICT



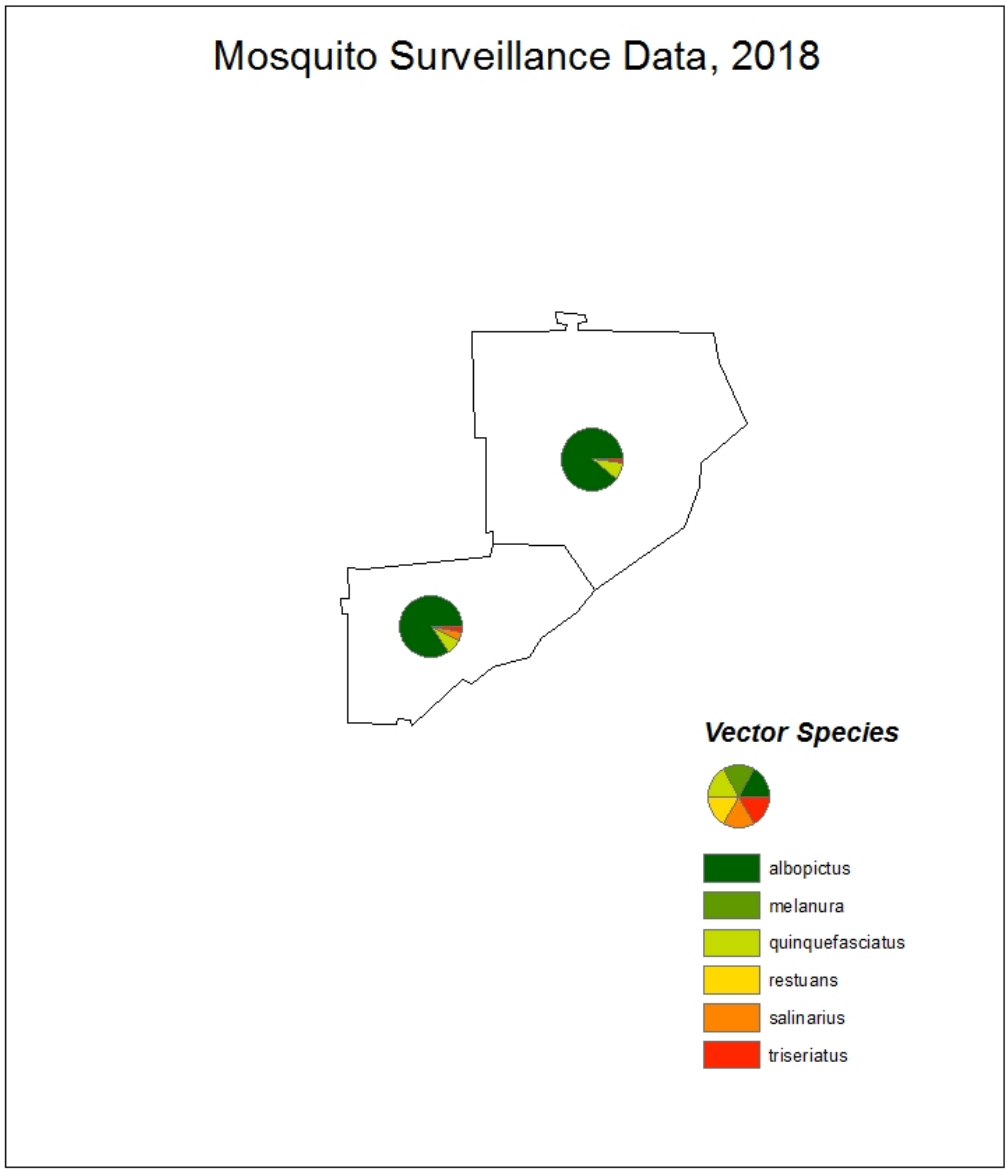
DATA BY DISTRICT

District 3-1

District 3-1		trap type			
County	**Species**	**BGS**	**CDC**	**gravid**	**other**
Cobb	*Ae. albopictus*	42	100	4	
	Ae. vexans		30		
	Aedes/Ochlerotatus spp.		11		
	An. crucians		6		
	An. punctipennis		16		
	Cq. perturbans		21		
	Cs. melanura		1		
	Culex spp.		2	1	
	Cx. erraticus		26		
	Cx. quinquefasciatus		10	4	
	Cx. restuans		2		1
	Cx. salinarius		1		
	Oc. japonicus		2	4	
	Oc. triseriatus		3		
	Tx. rutilus	3			
	unknown		4		
	Ur. sapphirina		2		
Douglas	*Ae. albopictus*		55		
	Ae. vexans		7		
	An. quadrimaculatus		1		
	Cx. erraticus		14		
	Cx. quinquefasciatus		5		
	Cx. salinarius		3		
	Oc. japonicus		6		
	Oc. triseriatus		2		
	Ps. cyanescens		1		
	Ps. horrida		2		

Surveillance in District 3-1 was done by of the VSCs. Surveillance was done from April - Oct over 20 trap nights.

DATA BY DISTRICT



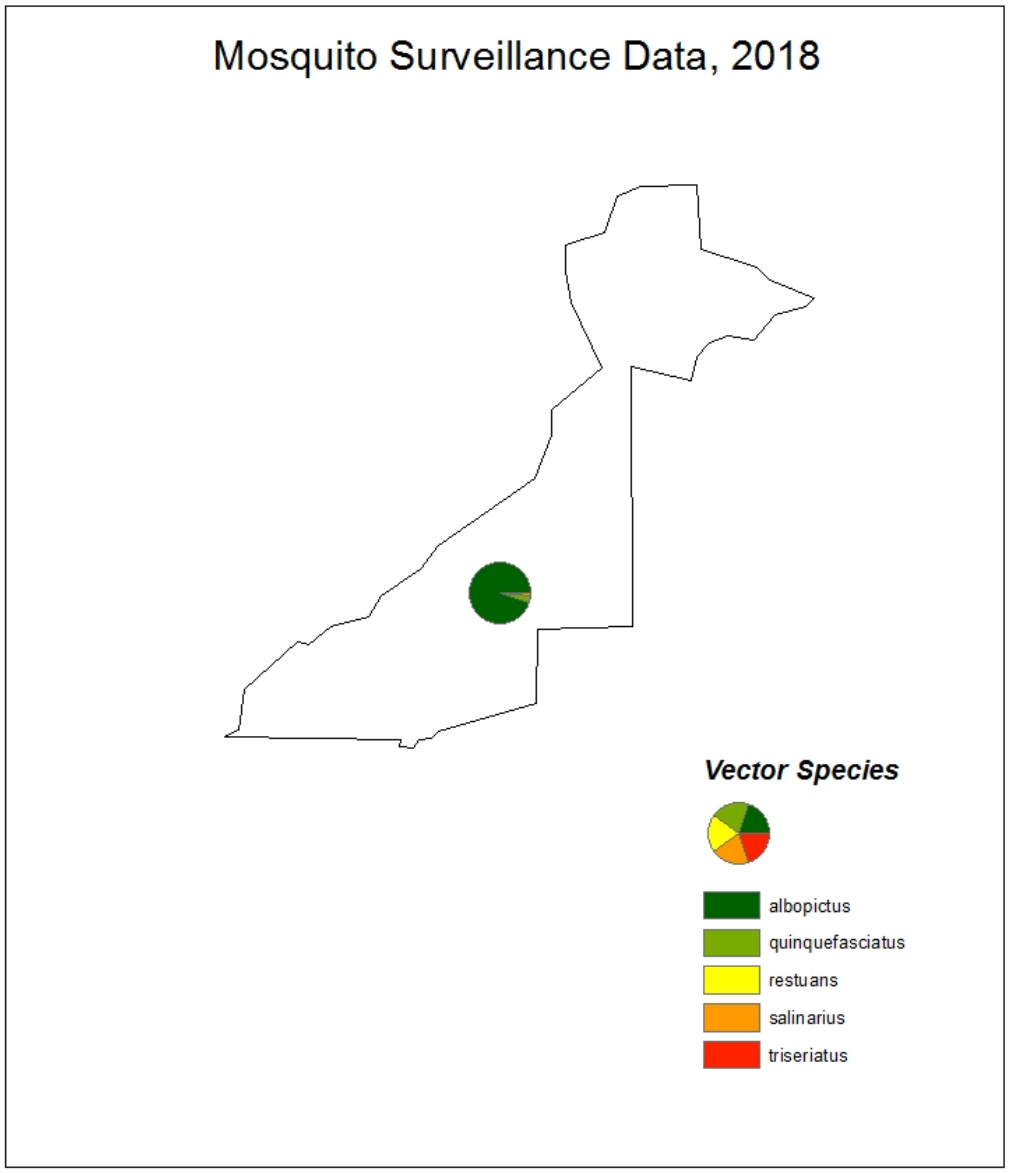
DATA BY DISTRICT

District 3-2

District 3-2		trap type		
County	**Species**	**BGS**	**CDC**	**gravid**
Fulton	*Ae. albopictus*	452	119	161
	Ae. vexans	3	29	8
	Aedes/Ochlerotatus spp.		2	
	An. crucians		2	
	An. punctipennis		6	1
	An. quadrimaculatus	2		
	Anopheles spp.			1
	Culex spp.	131	40	1080
	Cx. erraticus	12		
	Cx. quinquefasciatus		4	26
	Cx. restuans			1
	Cx. salinarius			9
	Cx. territans		1	3
	Oc. atlanticus		1	
	Oc. japonicus		4	
	Oc. triseriatus		1	6
	Or. signifera			1
	Ps. ciliata	1	1	
	Ps. howardii	1	2	
	Tx. rutilus	13	1	1

Surveillance in District 3-2 was done by Clarke Mosquito, a company that contracts with the District to do mosquito surveillance and control, and one of the VSCs. Surveillance was done from May - Oct over 197 trap nights.

DATA BY DISTRICT

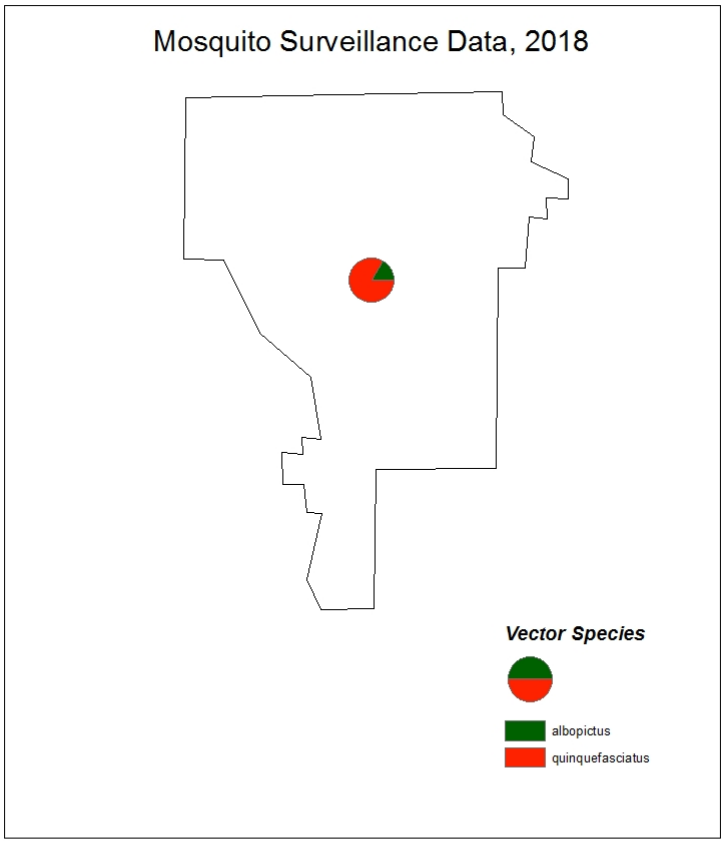


DATA BY DISTRICT

District 3-3

District 3-3		trap type
County	**Species**	**CDC**
Clayton	*Ae. albopictus*	3
	An. punctipennis	6
	Cx. quinquefasciatus	15

Surveillance in District 3-3 was done one of the VSCs. Surveillance was done in Feb and May over 3 trap nights.



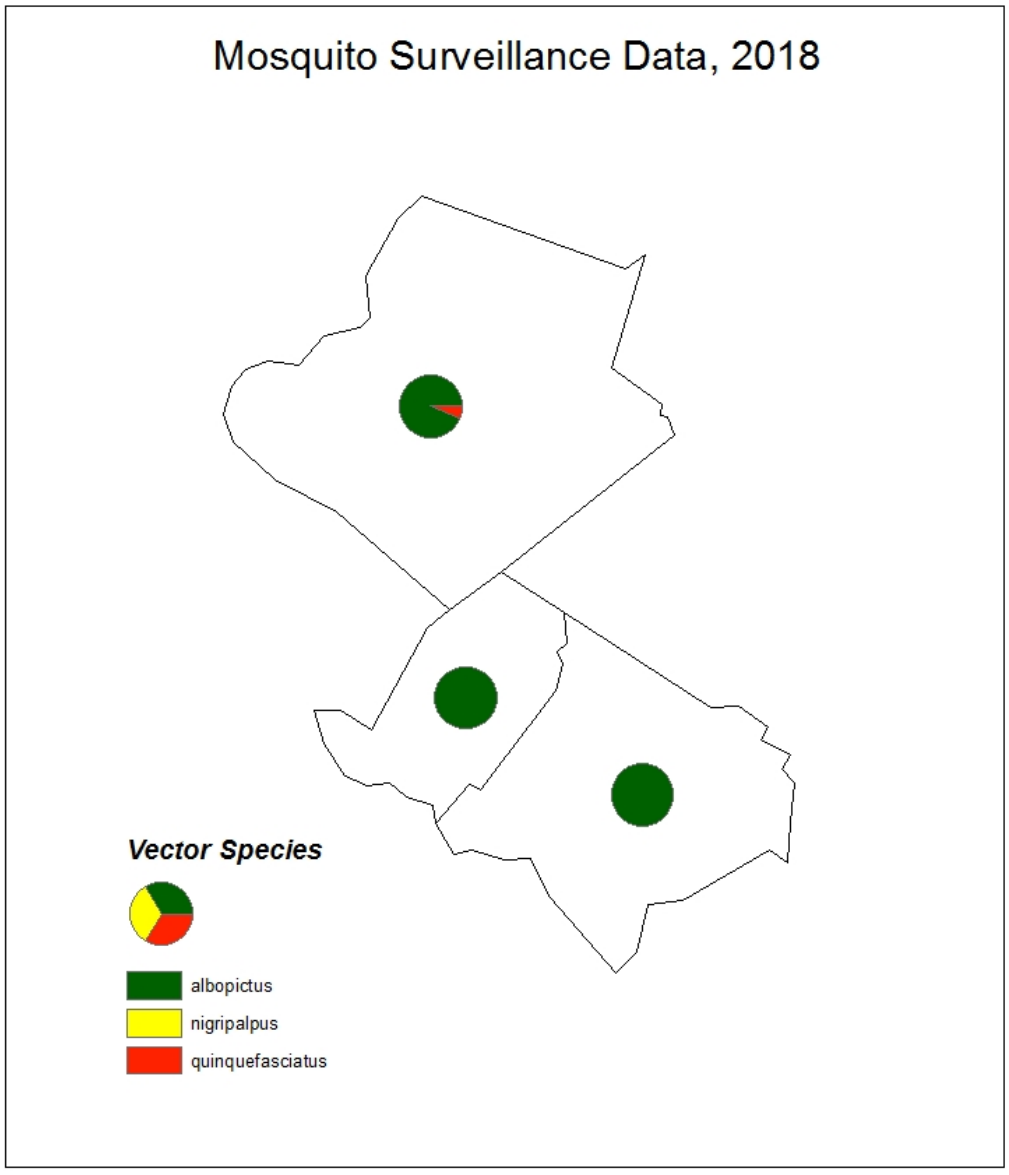
DATA BY DISTRICT

District 3-4

District 3-4		trap type	
County	**Species**	**CDC**	**gravid**
Gwinnett	*Ae. albopictus*	53	8
	Ae. vexans	5	
	An. crucians	1	
	An. punctipennis	1	
	Cq. perturbans	2	
	Cx. erraticus	3	
	Cx. quinquefasciatus	2	2
	Ps. ferox	6	
	Ps. horrida	2	
Newton	*Ae. albopictus*	15	
	Ae. vexans	2	
	Aedes/Ochlerotatus spp.	2	
	An. punctipennis	2	
	Cq. perturbans	12	
Rockdale	*Ae. albopictus*	3	
	Cx. erraticus	17	
	Cx. nigripalpus	2	

Surveillance in District 3-4 was done one of the DPH entomologists. Surveillance was done in June, July, and August over 5 trap nights.

DATA BY DISTRICT

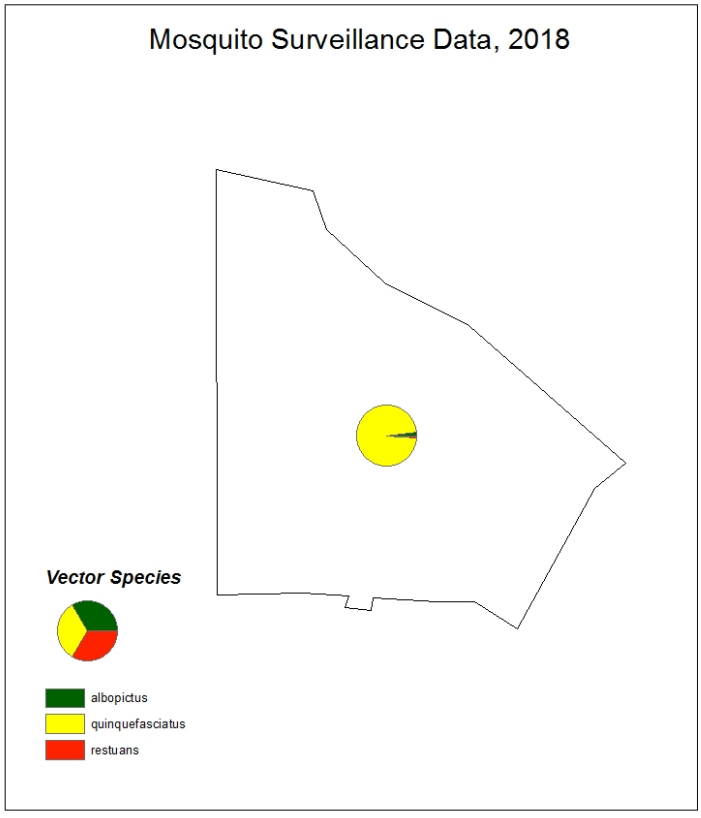


DATA BY DISTRICT

District 3-5

District 3-5		trap type	
County	Species	CDC	gravid
DeKalb	*Ae. albopictus*	15	158
	Aedes/Ochlerotatus spp.	2	
	An. punctipennis	6	
	Cx. quinquefasciatus	2	8656
	Cx. restuans		128
	Oc. japonicus	2	26

Surveillance in District 3-5 was done by interns in the Environmental Health program. Surveillance was done from July - Oct over 29 trap nights.



DATA BY DISTRICT

District 4-0

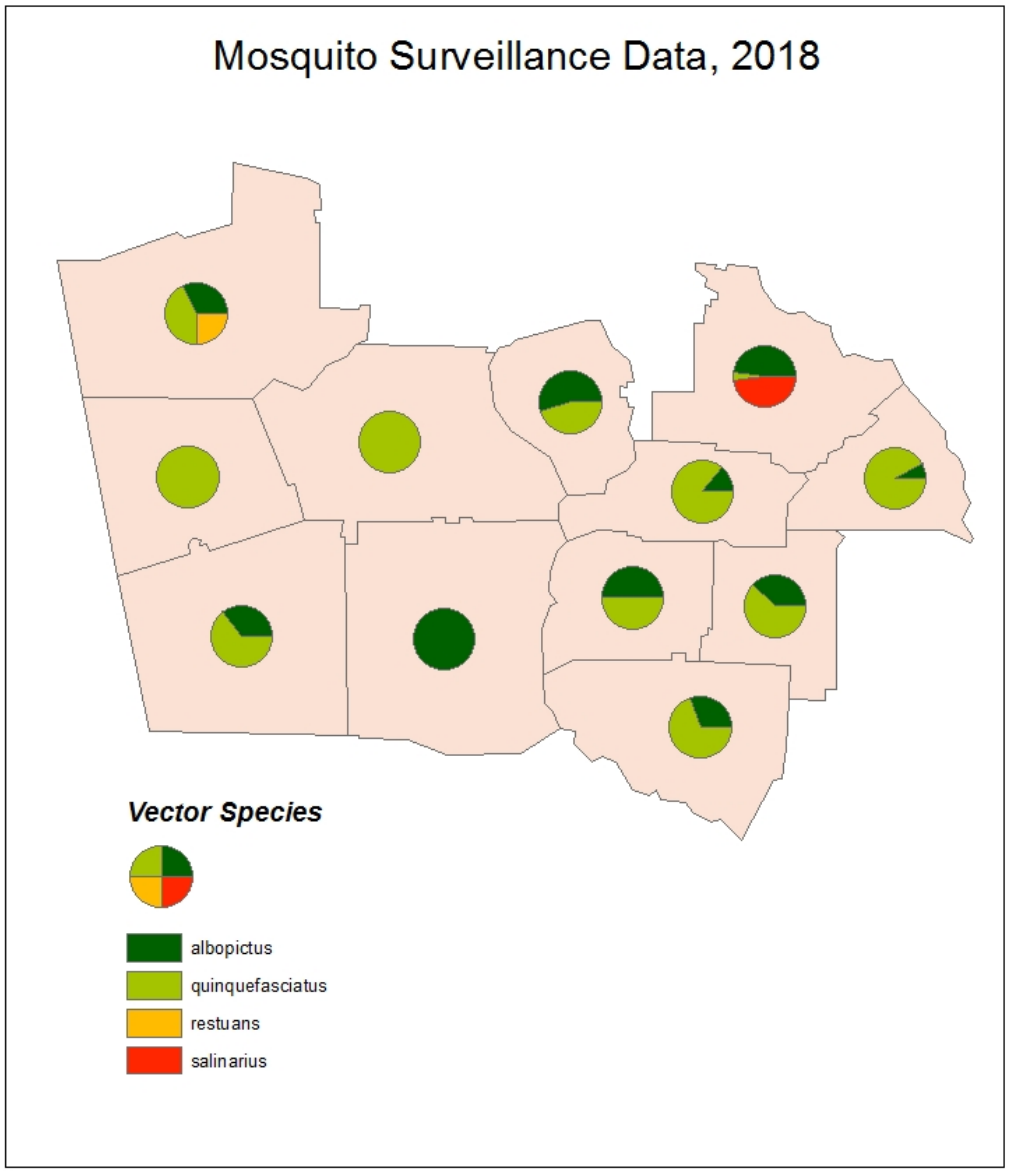
District 4-0		trap type	
County	**Species**	**CDC**	**gravid**
Butts	*Ae. albopictus*	1	4
	Anopheles spp.	3	
	Cx. quinquefasciatus	4	55
Carroll	*Ae. albopictus*	3	15
	Ae. albopictus (male)	5	
	An. punctipennis	2	
	Cx. quinquefasciatus	13	11
	Cx. restuans	14	
Coweta	*An. punctipennis*	13	
	Cx. quinquefasciatus	6	4
	Oc. japonicus	3	1
Fayette	*Ae. albopictus*	129	19
	Ae. albopictus (male)	49	4
	An. punctipennis		11
	Cx. quinquefasciatus	99	24
Harris	*Ae. albopictus*	6	1
	An. punctipennis	5	
	Cx. quinquefasciatus	86	2
Heard	*Ae. albopictus (male)*	1	
	Ae. vexans	1	
	Cx. quinquefasciatus	1	2
Henry	*Ae. albopictus*	16	8
	Ae. vexans	1	
	An. punctipennis	2	
	Cx. quinquefasciatus	1	1
	Cx. salinarius	24	
	Oc. japonicus		1
Lamar	*Ae. albopictus*	1	8
	An. crucians	53	
	An. punctipennis	16	
	Cx. quinquefasciatus		15
Meriwether	*Ae. albopictus*	2	106

Surveillance in District 4-0 was done by one of the VSCs. Surveillance was done in June, July, Sept, and Oct over 25 trap nights.

DATA BY DISTRICT

	Culex spp.		8
	Cx. erraticus	6	4
Pike	*Ae. albopictus*	3	4
	Cx. quinquefasciatus	5	2
	Oc. japonicus	1	
Spalding	*Ae. albopictus*	1	
	Ae. albopictus (male)	12	
	Ae. vexans	20	
	An. punctipennis	3	
	Culex spp. (male)		39
	Cx. quinquefasciatus	6	
Troup	*Ae. albopictus*	8	21
	An. punctipennis	2	2
	Culex spp.	6	
	Cx. quinquefasciatus	6	47
Upson	*Ae. albopictus*		4
	Ae. albopictus (male)	17	
	Cx. quinquefasciatus	4	5

DATA BY DISTRICT



DATA BY DISTRICT

District 5-1

District 5-1		trap type	
County	**Species**	**CDC**	**gravid**
Bleckley	*Ae. vexans*	9	
	An. punctipennis	3	
	Culex spp.	21	6
	Cx. erraticus	15	7
	Cx. quinquefasciatus	28	6
	Ps. ciliata	1	
	unknown	1	
Dodge	*Ae. albopictus*	30	1
	Ae. vexans	3	
	Aedes/Ochlerotatus spp.	1	
	An. crucians	2	
	An. punctipennis	11	
	An. quadrimaculatus	12	
	Anopheles spp.	4	
	Cq. perturbans		2
	Culex spp.	36	
	Cx. coronator	33	
	Cx. erraticus	18	
	Cx. nigripalpus	34	
	Cx. quinquefasciatus	17	
	Oc. atlanticus	7	
	Oc. fulvus pallens	1	
	Ps. ferox	1	
	unknown	6	
Johnson	*An. crucians*	7	
	An. quadrimaculatus	24	
	Anopheles spp.	6	
	Cq. perturbans	4	
	Culex spp.	79	3
	Cx. erraticus	41	
	Cx. nigripalpus	54	2
	Cx. quinquefasciatus	11	7

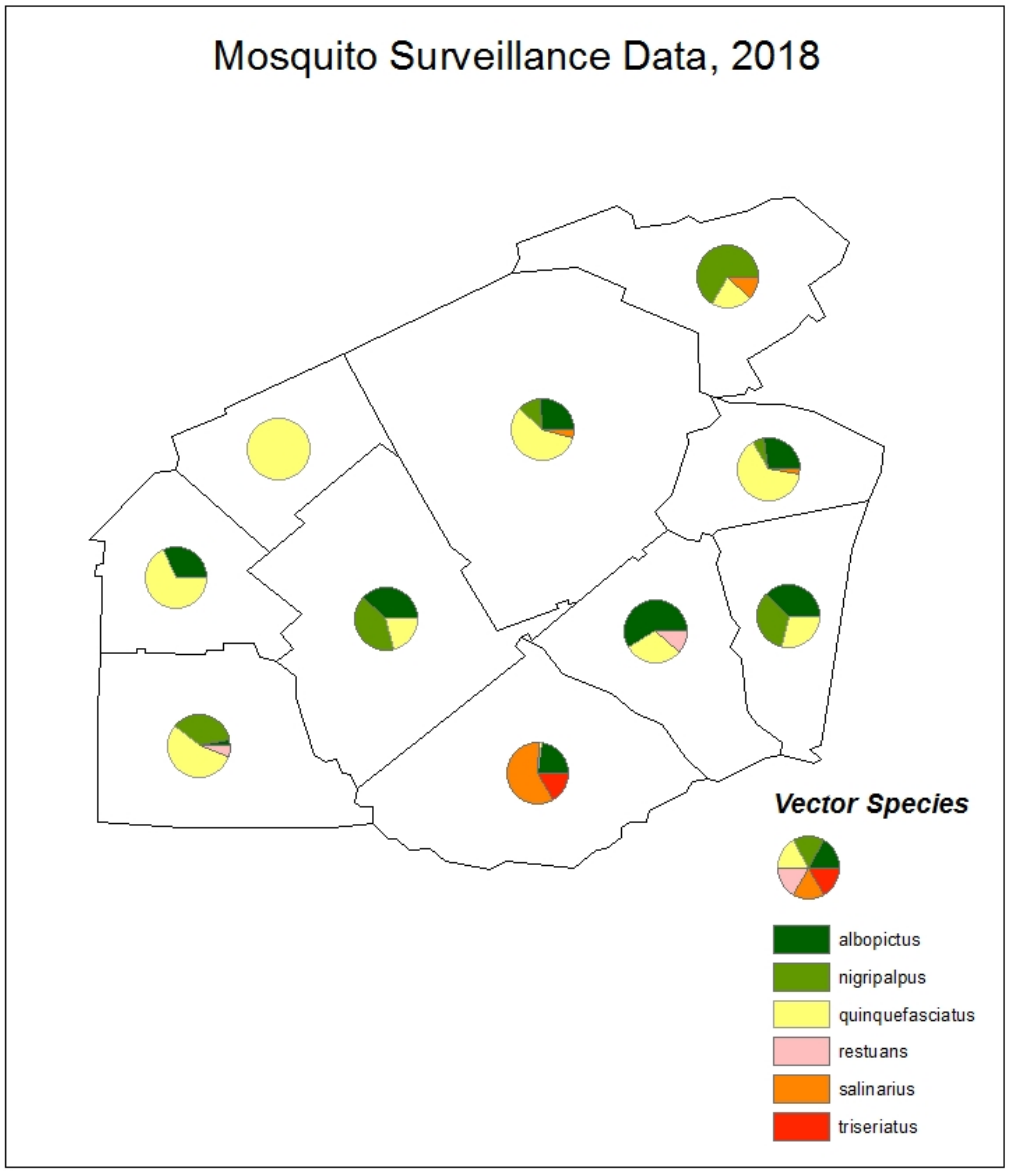
Surveillance in District 5-1 was done by several of the VSCs and an intern at the District. Surveillance was done from July - Sept over 41 trap nights.

	Cx. salinarius	10	
	unknown	4	
Laurens	*Ae. albopictus*	21	2
	An. crucians	1	
	An. punctipennis	2	
	Anopheles spp.	1	
	Culex spp.	7	1
	Cx. coronator	3	2
	Cx. erraticus	15	
	Cx. nigripalpus	11	
	Cx. quinquefasciatus	21	30
	Cx. salinarius	4	
	Cx. territans		12
	Ps. ciliata	5	
	Ps. columbiae	9	
	unknown	6	
Montgomery	*Ae. albopictus*	24	9
	Ae. vexans	15	
	Aedes/Ochlerotatus spp.	3	
	An. crucians	51	
	An. punctipennis	34	3
	Anopheles spp.	3	
	Cq. perturbans	4	
	Culex spp.	2	
	Cx. coronator	3	
	Cx. erraticus	8	4
	Cx. nigripalpus	30	
	Cx. quinquefasciatus	14	11
	Oc. atlanticus	19	
	Oc. trivittatus	9	
	Ps. ciliata	11	
	Ps. columbiae	12	1
	Ps. ferox	8	
	unknown	12	
Pulaski	*Ae. albopictus*	21	3
	Ae. vexans	2	
	Culex spp.	3	

	Cx. quinquefasciatus	40	12
	Ps. columbiae	5	
	Ps. ferox	13	2
	unknown	5	
Telfair	*Ae. albopictus*	11	4
	Ae. cinereus	11	
	An. crucians	31	
	Anopheles spp.		2
	Cq. perturbans	39	
	Culex spp.	10	
	Cx. quinquefasciatus		1
	Cx. salinarius	38	1
	Oc. infirmatus	8	
	Oc. triseriatus	11	
	Or. signifera	1	
	unknown	34	
Treutlen	*Ae. albopictus*	18	5
	Aedes/Ochlerotatus spp.	1	
	An. crucians	2	
	An. quadrimaculatus	3	
	Anopheles spp.		1
	Culex spp.	2	3
	Cx. erraticus	6	
	Cx. nigripalpus	5	
	Cx. quinquefasciatus	21	32
	Cx. salinarius	2	
	Oc. atlanticus	1	
	Ur. sapphirina	2	
Wheeler	*Ae. albopictus*	13	8
	Aedes/Ochlerotatus spp.	2	
	An. crucians	15	
	An. punctipennis	6	
	Anopheles spp.		5
	Culex spp.	3	
	Cx. erraticus	10	
	Cx. quinquefasciatus	7	4
	Cx. restuans	4	

	Oc. infirmatus	4	
	Ps. ciliata	8	
	Ps. columbiae	12	
	Ps. ferox	23	
Wilcox	*Ae. albopictus*	4	2
	Ae. vexans	3	
	An. punctipennis	18	
	Anopheles spp.		2
	Cq. perturbans	21	
	Culex spp.	152	
	Cx. coronator	4	
	Cx. erraticus	78	
	Cx. nigripalpus	62	
	Cx. quinquefasciatus	91	5
	Cx. restuans	10	
	Cx. salinarius	1	
	Oc. atlanticus	4	
	Ps. columbiae	2	
	Ps. ferox	4	
	unknown	15	

DATA BY DISTRICT



DATA BY DISTRICT

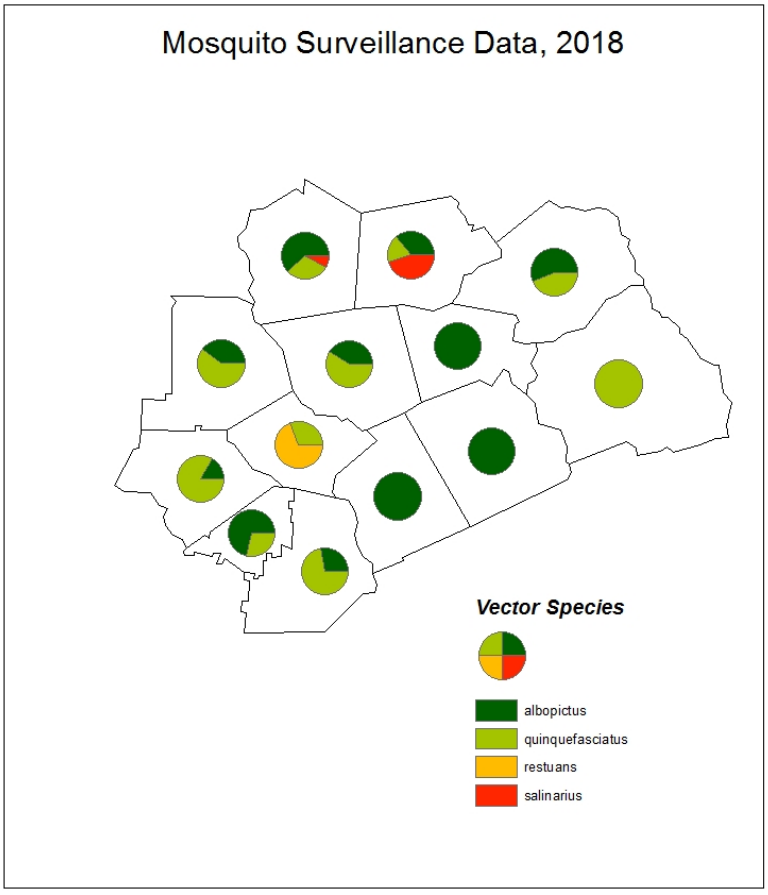
District 5-2

District 5-2		trap type	
County	**Species**	**CDC**	**gravid**
Baldwin	*Ae. albopictus*		3
Bibb	*Culex spp.*		5
	Cx. quinquefasciatus		8
	Cx. restuans		18
	unknown		4
	Ur. sapphirina		1
Crawford	*Ae. albopictus*		3
	Ae. vexans		1
	An. crucians		1
	Cq. perturbans		2
	Cx. quinquefasciatus		15
Hancock	*Ae. albopictus*		9
	Cx. quinquefasciatus		7
Houston	*Ae. albopictus*		7
	Ae. vexans		2
	Cx. coronator		1
	Cx. quinquefasciatus		18
Jasper	*Ae. albopictus*	2	6
	Cx. quinquefasciatus		4
	Cx. salinarius		1
Jones	*Ae. albopictus*		7
	Cq. perturbans		2
	Cx. erraticus		1
	Cx. quinquefasciatus		10
Monroe	*Ae. albopictus*		4
	Ae. vexans		3
	Cx. erraticus		2
	Cx. quinquefasciatus		6
Peach	*Ae. albopictus*		5
	Cx. quinquefasciatus		2
Putnam	*Ae. albopictus*		4
	An. punctipennis		2

Surveillance in District 5-2 was done by several of the VSCs and an intern at the District. Surveillance was done from July - Sept over 41 trap nights.

DATA BY DISTRICT

	Cx. quinquefasciatus		2
	Cx. salinarius		5
Twiggs	*Ae. albopictus*		7
	Anopheles spp.		2
Washington	*Anopheles spp.*		3
	Cx. quinquefasciatus		4
Wilkinson	*Ae. albopictus*		2



DATA BY DISTRICT

District 6-0

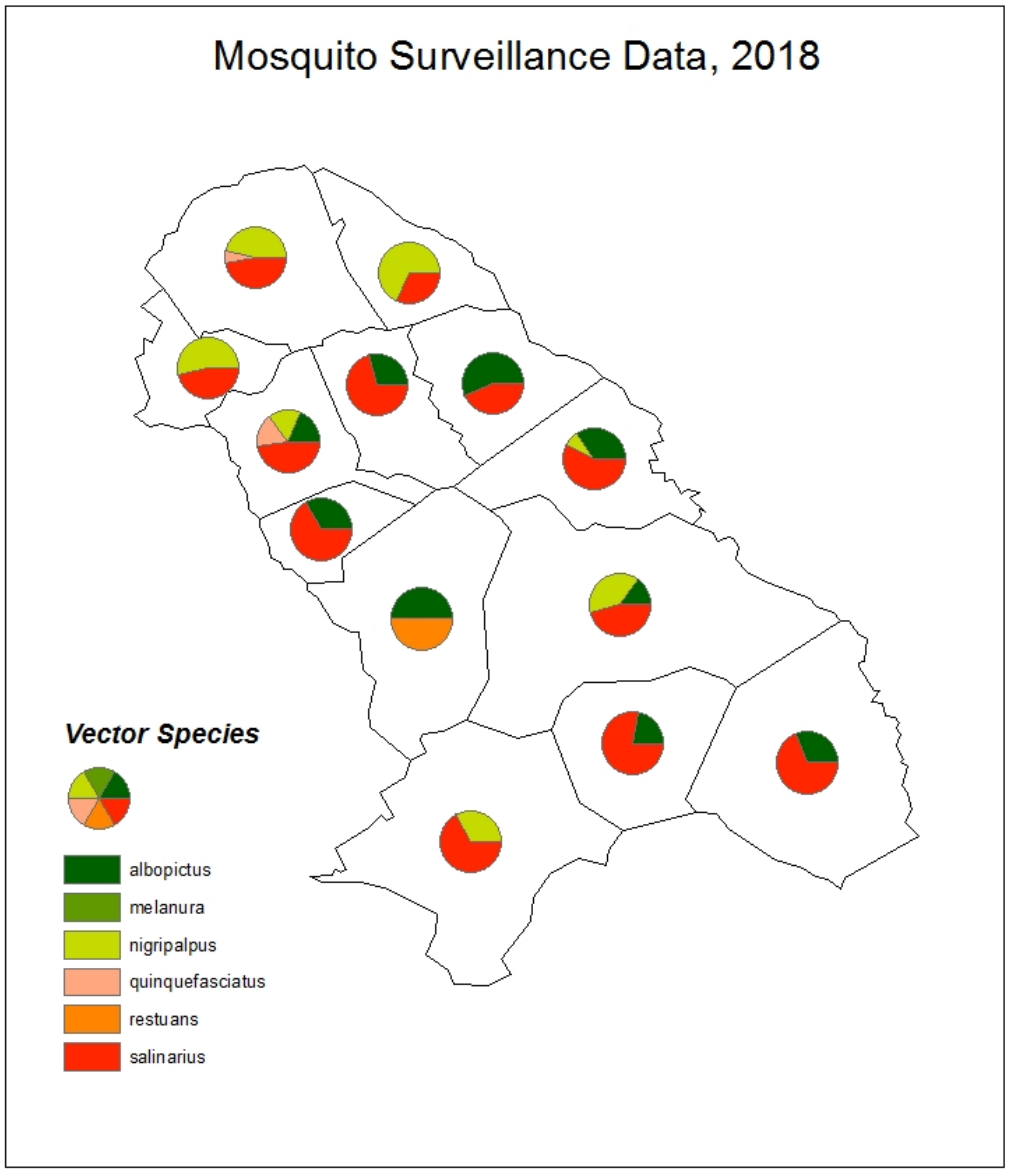
District 6-0		trap type		
County	**Species**	**BGS**	**CDC**	**gravid**
Burke	*Ae. albopictus*		2	
	Ae. vexans		3	
	An. crucians		1	
	Cx. nigripalpus		4	1
	Cx. salinarius		5	1
	Oc. mitchellae		1	
Columbia	*Ae. albopictus*	3	9	6
	Ae. vexans	1	8	3
	Cx. erraticus		1	
	Cx. salinarius		6	8
	Oc. japonicus			11
Emanuel	*Cx. nigripalpus*		2	5
	Cx. salinarius		3	11
Glascock	*Ae. albopictus*	2		
	Ae. vexans		3	
	An. crucians		6	
	An. punctipennis		2	
	An. quadrimaculatus		5	
	Cx. salinarius	1	3	
	Oc. mitchellae		3	
	Or. signifera			4
Jefferson	*Ae. albopictus*	6		
	Ae. vexans			1
	An. crucians		4	
	An. quadrimaculatus		10	
	Cx. erraticus			4
	Cx. restuans			6
Jenkins	*Ae. albopictus*	2		
	Ae. vexans		7	1
	An. crucians		21	10
	An. punctipennis		22	6
	An. quadrimaculatus	1	25	9

Surveillance in District 6-0 was done by the Richmond County Mosquito Control program. Surveillance was done from Jan - Dec over 397 trap nights.

	Cx. salinarius		7	
	Ma. titillans	1	6	
	Oc. japonicus			1
Lincoln	*Ae. vexans*		1	
	An. punctipennis			1
	Cx. erraticus		1	
	Cx. nigripalpus		3	8
	Cx. salinarius		1	4
McDuffie	*Ae. albopictus*		2	5
	Ae. vexans		3	
	Cx. erraticus		3	
	Cx. salinarius		6	11
	Oc. japonicus			1
Richmond	*Ae. albopictus*		634	926
	Ae. cinereus		5	
	Ae. vexans		1070	414
	An. crucians		421	45
	An. punctipennis		216	31
	An. quadrimaculatus		159	15
	Cq. perturbans		57	8
	Cs. melanura		1	1
	Cx. coronator		14	2
	Cx. erraticus		240	38
	Cx. nigripalpus		269	83
	Cx. quinquefasciatus		17	7
	Cx. restuans		9	6
	Cx. salinarius		1479	1115
	Cx. territans		1	
	Ma. dyari		2	2
	Ma. titillans		28	7
	Oc. atlanticus		1	
	Oc. dupreei		3	1
	Oc. fulvus pallens		3	
	Oc. japonicus		1	
	Oc. mitchellae		43	3
	Oc. taeniorhynchus		4	
	Or. alba		2	3

	Or. signifera			1
	Ps. ciliata		1	
	Ps. columbiae		1	
	Ps. ferox		265	40
	Ps. horrida		1	
	Ps. howardii		17	4
	Tx. rutilus			4
	Ur. lowii		26	
	Ur. sapphirina		19	
Screven	*Ae. albopictus*	5		
	Ae. vexans		5	3
	An. crucians		10	
	An. quadrimaculatus		1	2
	Cx. salinarius			11
	Oc. mitchellae		2	
Taliaferro	*Ae. vexans*			16
	An. crucians		16	
	An. punctipennis			1
	An. quadrimaculatus		5	4
	Cx. nigripalpus		16	
	Cx. salinarius		12	2
	Ma. titillans		4	
	Oc. japonicus			9
Warren	*Ae. albopictus*		3	5
	An. quadrimaculatus			2
	Cx. erraticus		1	
	Cx. nigripalpus		7	
	Cx. quinquefasciatus		3	4
	Cx. salinarius		20	
Wilkes	*An. punctipennis*		1	
	Cx. nigripalpus			7
	Cx. quinquefasciatus			1
	Cx. salinarius	1	2	4
	Oc. japonicus			2
	Ur. sapphirina		1	

DATA BY DISTRICT



DATA BY DISTRICT

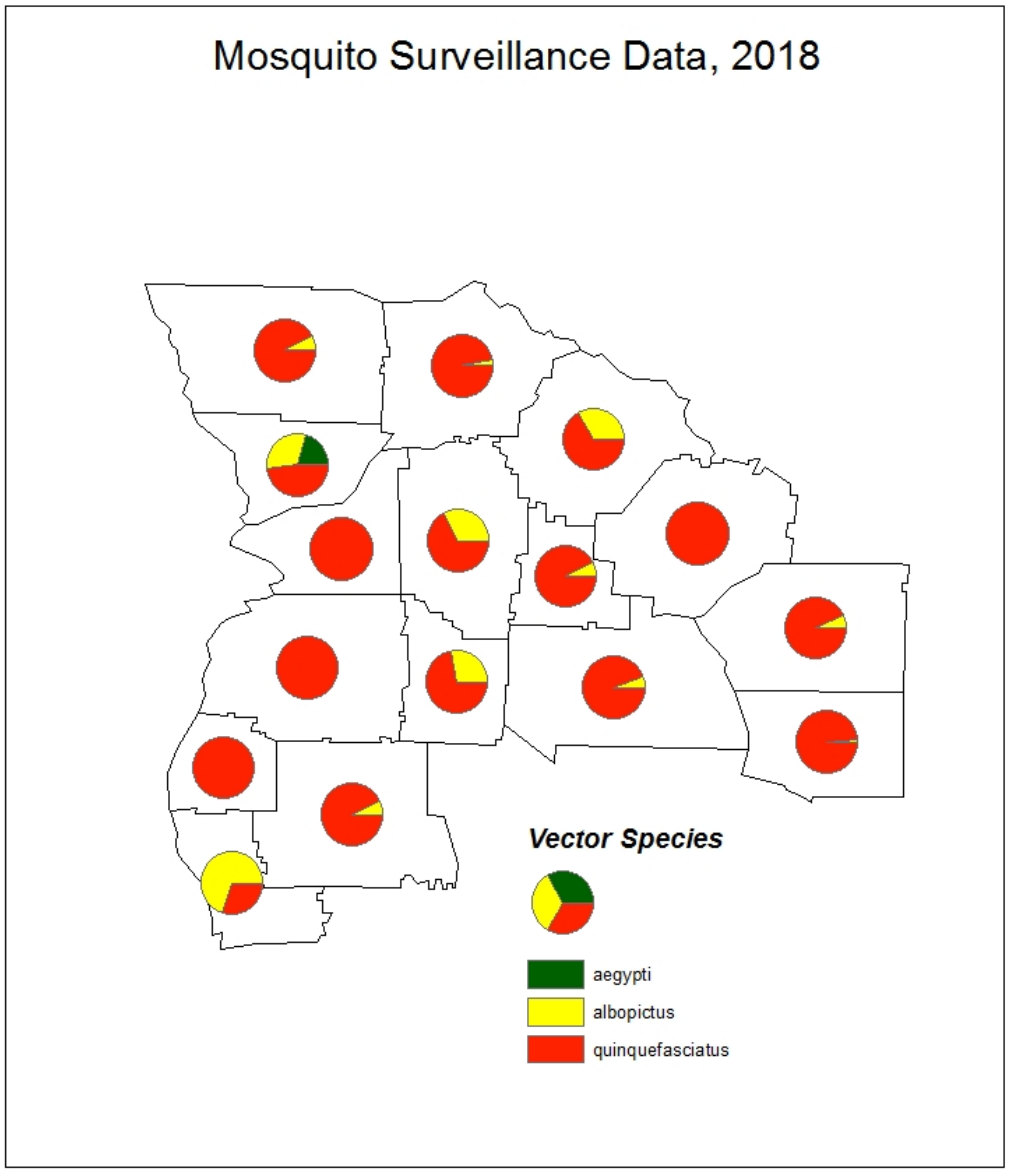
District 7-0

District 7-0		trap type	
County	**Species**	**CDC**	**gravid**
Chattahoochee	*An. punctipennis*	2	
	Culex spp. (male)	1	
	Cx. quinquefasciatus		11
Clay	*Ae. albopictus*	3	13
	Cx. quinquefasciatus	5	2
Crisp	*Ae. albopictus*		2
	Ae. vexans	11	
	An. punctipennis	11	
	An. punctipennis (male)		1
	Cx. quinquefasciatus	124	21
	Ps. columbiae	15	
Dooly	*Ae. albopictus*		1
	Cx. quinquefasciatus	13	1
Macon	*Culex spp.*		17
	Cx. quinquefasciatus	1	
Marion	*Ae. albopictus*	12	
	An. punctipennis	7	
	Cx. quinquefasciatus	25	
Muscogee	*Ae. aegypti*	11	6
	Ae. albopictus	13	13
	Ae. albopictus (male)	17	
	An. punctipennis	8	1
	Culex spp.	22	
	Culex spp. (male)	19	
	Cx. quinquefasciatus	29	11
Quitman	*Ae. vexans*	5	
	Cx. quinquefasciatus	13	2
Randolph	*Ae. albopictus*	13	
	An. punctipennis	9	
	An. punctipennis (male)	7	
	Cx. quinquefasciatus	119	53
Schley	*Ae. albopictus*		1

Surveillance in District 7-0 was done by one of the VSCs. Surveillance was done in Feb, May, June, Aug, and Sept over 27 trap nights.

	Cx. quinquefasciatus	7	5
Stewart	*Ae. vexans*	1	2
	An. punctipennis	3	
	Cx. quinquefasciatus		10
Sumter	*Ae. albopictus*		1
	Ae. vexans	2	
	An. punctipennis	1	
	Cx. quinquefasciatus	5	11
Talbot	*Ae. albopictus*	3	
	Ae. vexans		3
	An. punctipennis	4	
	Cx. quinquefasciatus	78	10
Taylor	*Ae. albopictus*	2	2
	An. punctipennis	2	
	Cx. quinquefasciatus	5	3
Webster	*Ae. albopictus*	19	7
	An. quadrimaculatus	4	
	Cx. quinquefasciatus	8	60

DATA BY DISTRICT



DATA BY DISTRICT

District 8-1

District 8-1		trap type		
County	**Species**	**CDC**	**gravid**	**NA**
Ben Hill	*Ae. albopictus*	13	12	
	Ae. albopictus (male)		2	
	Ae. vexans	50		
	An. crucians	70		
	An. punctipennis	5		
	An. quadrimaculatus	4		
	Cq. perturbans	13		
	Cs. melanura	42	6	
	Culex spp.	9	48	
	Culex spp. (male)		18	
	Cx. coronator	43	1	
	Cx. erraticus	6	2	
	Cx. nigripalpus	125	18	
	Cx. quinquefasciatus	39	435	
	Cx. restuans	1	4	
	Cx. salinarius	8		
	Oc. infirmatus	1		
	Oc. triseriatus	1		
	Ps. ferox	2		
	Ps. howardii (male)	1		
	Ur. lowii	2		
Berrien	*Ae. albopictus*	9	9	
	Ae. vexans	11		
	Aedes/Ochlerotatus spp.	1		
	An. crucians	29		
	An. punctipennis	1		
	An. quadrimaculatus	10		
	Cq. perturbans	5		
	Cs. melanura	8	2	
	Culex spp.	6	195	
	Culex spp. (male)	1	12	
	Cx. coronator	11		

Surveillance in District 8-1 was done by the local EHS and students from VSU, as well as one of the VSCs. Surveillance was done from March - Oct over 998 trap nights.

	Cx. erraticus	207	30	
	Cx. nigripalpus	120	149	
	Cx. quinquefasciatus	34	1191	
	Oc. infirmatus	2		
	Ps. columbiae	10		
	Ur. sapphirina	1		
Brooks	*Ae. albopictus*	11	2	
	Ae. vexans	4		
	An. crucians	32		
	An. punctipennis	2		
	An. quadrimaculatus	5		
	An. quadrimaculatus (male)	1		
	Anopheles spp. (male)	1		
	Cq. perturbans	34		
	Cs. melanura	12	4	
	Culex spp.	20	84	
	Culex spp. (male)	15	13	
	Cx. coronator	9	2	
	Cx. erraticus	87	1	
	Cx. nigripalpus	93	286	
	Cx. quinquefasciatus	101	293	
	Cx. restuans	3	33	
	Cx. salinarius	10	1	
	Oc. fulvus pallens	1		
	Oc. infirmatus	3		
	Ps. columbiae	1		
	Ur. sapphirina	7		
	Ur. sapphirina (male)	3	1	
Cook	*Ae. albopictus*	12	12	
	Ae. albopictus (male)	1	2	
	Ae. vexans	10		
	Ae. vexans (male)		1	
	An. crucians	46	46	
	An. quadrimaculatus	2		
	Anopheles spp.		2	
	Cq. perturbans	3	3	

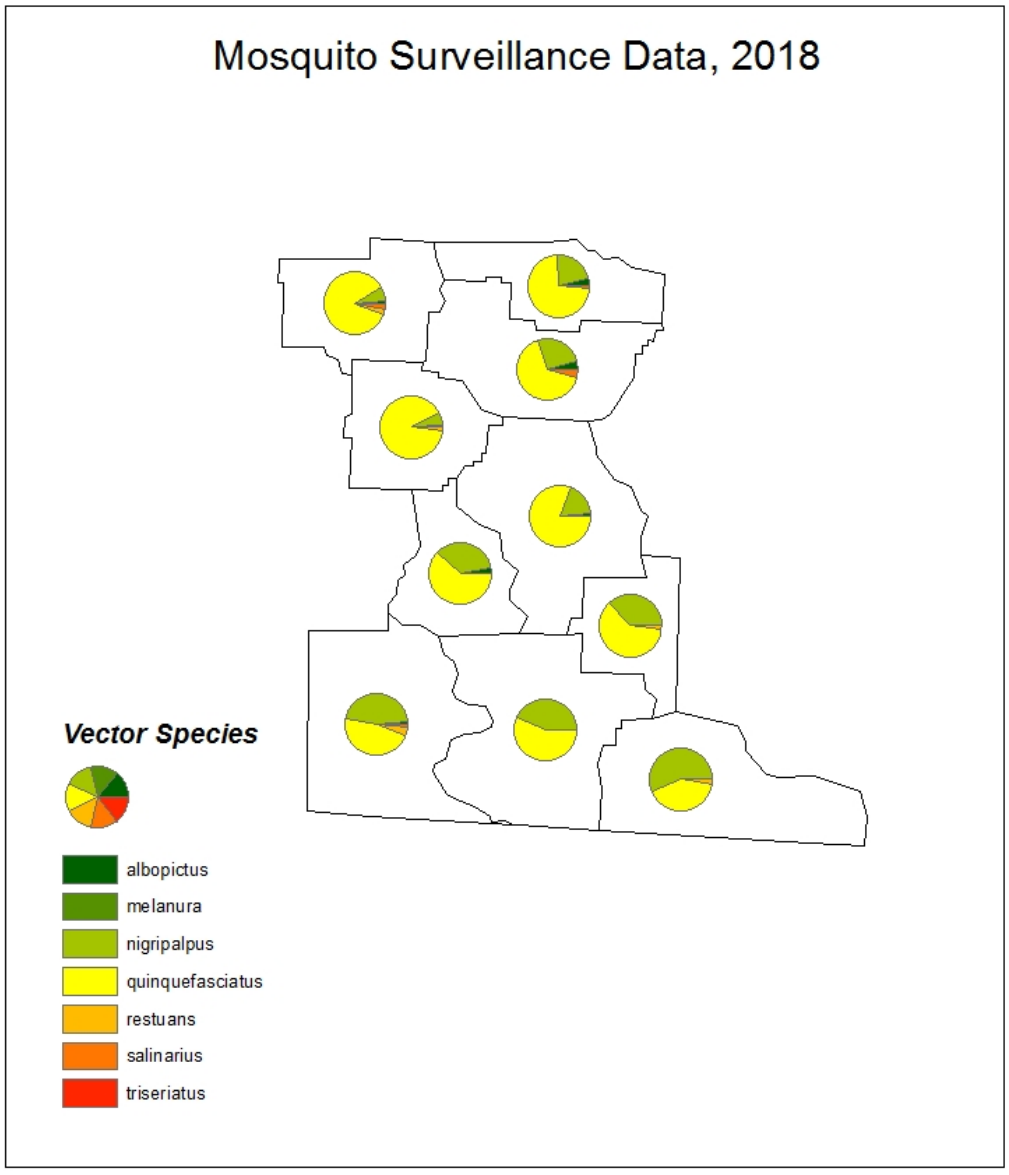
	Cs. melanura	18	7	
	Culex spp.	16	560	
	Culex spp. (male)	1	21	
	Cx. coronator	2	7	
	Cx. erraticus	18	48	
	Cx. erraticus (male)	1		
	Cx. nigripalpus	30	266	
	Cx. quinquefasciatus	25	491	
	Cx. restuans	1		
	Ma. titillans	1		
	Oc. infirmatus	1		
	Ps. ciliata	2		
	Ps. columbiae	52	4	
	Ps. ferox (male)	1		
	Ur. sapphirina	1		
Echols	*Ae. albopictus*	6	12	6
	Ae. vexans	13		
	Aedes/Ochlerotatus spp.	1		
	An. crucians	43		112
	An. crucians (male)			1
	An. punctipennis	9		
	An. quadrimaculatus	2		1
	Cq. perturbans	13		2
	Cs. melanura	204	9	75
	Cs. melanura (male)		1	2
	Culex spp.	69	69	39
	Culex spp. (male)	8	21	16
	Cx. coronator	5		1
	Cx. erraticus	182	2	116
	Cx. nigripalpus	1056	71	408
	Cx. quinquefasciatus	116	768	241
	Cx. restuans	16	46	3
	Cx. salinarius	13	8	
	Cx. territans		2	
	Ma. titillans	2		4
	Oc. atlanticus	2	1	29
	Oc. canadensis	2		

	Oc. infirmatus	1		5
	Ps. columbiae	26		39
	Ps. ferox	1		12
	Ur. lowii	1		2
	Ur. sapphirina	6		1
	Ur. sapphirina (male)	3		1
Irwin	*Ae. albopictus*	3	13	
	Ae. albopictus (male)		1	
	Ae. vexans	4	2	
	Aedes/Ochlerotatus spp.		1	
	An. crucians	7	16	
	An. quadrimaculatus	10	6	
	Cq. perturbans	9	7	
	Culex spp.	3	65	
	Culex spp. (male)	1	10	
	Cx. coronator	2	5	
	Cx. erraticus	7	15	
	Cx. nigripalpus	57	47	
	Cx. quinquefasciatus	7	258	
	Cx. restuans		4	
	Cx. salinarius	16	1	
	Ps. ciliata	2		
	Ps. columbiae	7	6	
	Ur. sapphirina	3	1	
Lanier	*Ae. albopictus*	2	7	
	Ae. albopictus (male)		2	
	Ae. vexans	34		
	An. crucians	432		
	An. crucians (male)	1		
	An. punctipennis	1		
	An. quadrimaculatus	5		
	Anopheles spp.	2		
	Anopheles spp. (male)	7		
	Cq. perturbans	15		
	Cs. melanura	21	1	
	Culex spp.	32	62	
	Culex spp. (male)	6	19	

	Cx. coronator	11	1	
	Cx. erraticus	211	1	
	Cx. nigripalpus	230	119	
	Cx. quinquefasciatus	81	499	
	Cx. restuans		15	
	Cx. salinarius	9		
	Oc. atlanticus	3		
	Oc. canadensis	1		
	Oc. infirmatus	2		
	Ps. columbiae	3		
	Ur. lowii	26	2	
	Ur. sapphirina	43	4	
	Ur. sapphirina (male)	23	1	
Lowndes	*Cq. perturbans*	3981	6	
	Cs. melanura	2027	34	
	Cx. coronator	11		
	Cx. nigripalpus	6571	2306	
	Cx. quinquefasciatus	118	11600	
	Cx. restuans	6	78	
	Cx. salinarius	1	1	
	Oc. triseriatus	5		
Tift	*Ae. albopictus*	2	6	
	Ae. albopictus (male)		3	
	Ae. vexans	72		
	An. crucians	51		
	An. punctipennis	1		
	An. quadrimaculatus	5		
	Anopheles spp.	1		1
	Cq. perturbans	4		
	Cs. melanura	5	5	
	Culex spp.	7	81	
	Culex spp. (male)	3	13	
	Cx. coronator	5		
	Cx. erraticus	8	1	
	Cx. nigripalpus	28	20	
	Cx. quinquefasciatus	41	608	
	Cx. restuans	2	9	

	Cx. salinarius	2		
	Oc. infirmatus	1		
	Oc. mitchellae	4		
	Ps. columbiae	2		
	Ps. ferox	13		
Turner	*Ae. albopictus*	4	10	
	Ae. vexans	18	1	
	Ae. vexans (male)	1		
	An. crucians	24		
	An. punctipennis	2		
	An. quadrimaculatus	19		
	An. quadrimaculatus (male)		1	
	Cq. perturbans	4	1	
	Cs. melanura	4	1	
	Culex spp.	12	97	
	Culex spp. (male)	3	30	
	Cx. coronator	57		
	Cx. erraticus	22	5	
	Cx. erraticus (male)	1		
	Cx. nigripalpus	46	37	
	Cx. quinquefasciatus	23	883	
	Cx. restuans	1	32	
	Cx. salinarius	37		
	Cx. territans	1		
	Or. signifera	1	1	
	Ps. columbiae	17		
	Ps. ferox	15		
	Ps. howardii (male)	1		
	Ur. sapphirina	16	1	
	Ur. sapphirina (male)	2		

DATA BY DISTRICT



DATA BY DISTRICT

District 8-2

District 8-2		trap type	
County	**Species**	**CDC**	**gravid**
Baker	*Ae. albopictus*	2	3
	Ae. albopictus (male)	2	
	Ae. vexans (male)		1
	Cq. perturbans	4	
	Cs. melanura	5	
	Culex spp.	1	
	Culex spp. (male)		4
	Cx. erraticus	2	
	Cx. nigripalpus	18	6
	Cx. quinquefasciatus	1	25
	Cx. restuans	5	4
Calhoun	*Ae. albopictus*	5	
	Ae. albopictus (male)		1
	An. punctipennis	2	
	Culex spp. (male)		2
	Cx. erraticus	2	
	Cx. nigripalpus	15	9
	Cx. quinquefasciatus	2	23
	Cx. salinarius	3	3
Colquitt	*An. crucians*		2
	Cq. perturbans	2	
	Cs. melanura	11	5
	Culex spp.	3	2
	Culex spp. (male)	1	1
	Cx. nigripalpus	19	12
	Cx. quinquefasciatus		33
Decatur	*Ae. albopictus*		1
	Ae. vexans	2	
	An. crucians	6	
	Cq. perturbans	5	4
	Culex spp. (male)		4
	Cx. nigripalpus	38	12

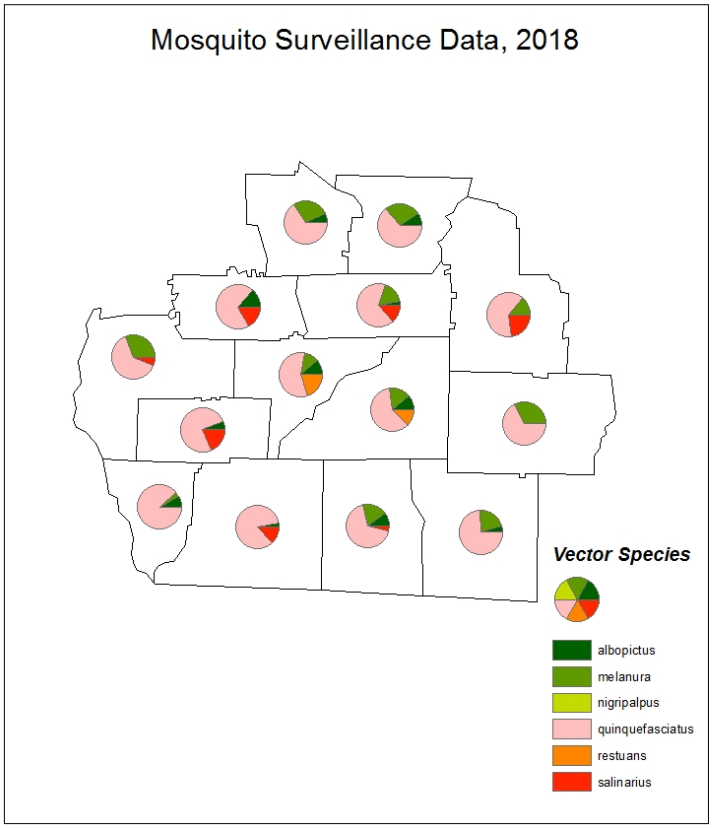
Surveillance in District 8-2 was done by one of the VSCs. Surveillance was done from June - Oct over 36 trap nights.

	Cx. quinquefasciatus	7	25
	Cx. salinarius	5	
Dougherty	*Ae. albopictus*		9
	Ae. albopictus (male)		4
	Ae. vexans (male)		2
	Cq. perturbans	39	
	Cs. melanura	38	9
	Culex spp.	3	12
	Culex spp. (male)	7	13
	Cx. nigripalpus	90	57
	Cx. quinquefasciatus	13	168
	Cx. salinarius	21	17
Early	*Ae. albopictus (male)*		3
	Cq. perturbans	4	
	Cs. melanura	6	9
	Culex spp. (male)		4
	Cx. nigripalpus	20	11
	Cx. quinquefasciatus	3	28
	Cx. salinarius	3	
Grady	*Ae. albopictus*	4	7
	Ae. albopictus (male)	1	3
	Cq. perturbans	15	2
	Cs. melanura	6	14
	Culex spp.	2	2
	Culex spp. (male)		6
	Cx. nigripalpus	8	6
	Cx. quinquefasciatus	6	68
	Cx. salinarius		4
Lee	*Ae. albopictus*		4
	Ae. albopictus (male)		1
	Cq. perturbans	5	
	Cs. melanura	4	8
	Culex spp. (male)		1
	Cx. nigripalpus	16	4
	Cx. quinquefasciatus	5	23
Miller	*Ae. albopictus*		1
	Ae. vexans	1	

	Cq. perturbans	8	1
	Culex spp. (male)		2
	Cx. erraticus	2	
	Cx. nigripalpus	19	3
	Cx. quinquefasciatus		12
	Cx. salinarius	3	
Mitchell	*Ae. albopictus*	6	
	Ae. albopictus (male)		1
	Cs. melanura	9	
	Culex spp. (male)	1	3
	Cx. coronator	2	
	Cx. nigripalpus	19	13
	Cx. quinquefasciatus	5	29
	Cx. restuans		7
Seminole	*Ae. albopictus*		5
	Ae. albopictus (male)		2
	Ae. vexans	2	
	An. crucians	4	
	Cq. perturbans	6	5
	Cs. melanura	2	
	Culex spp. (male)		6
	Cx. nigripalpus	19	20
	Cx. quinquefasciatus	2	51
Terrell	*Ae. albopictus*		2
	Ae. albopictus (male)		1
	Ae. vexans	2	
	Cq. perturbans	3	
	Cs. melanura	5	3
	Cx. nigripalpus	15	5
	Cx. quinquefasciatus		19
Thomas	*Ae. albopictus*		3
	Ae. albopictus (male)	1	
	Anopheles spp.		5
	Cq. perturbans	8	8
	Cs. melanura	6	8
	Culex spp.	3	
	Culex spp. (male)	1	6

DATA BY DISTRICT

	Cx. nigripalpus	20	17
	Cx. quinquefasciatus	1	48
Worth	*Cq. perturbans*	13	
	Cs. melanura	9	6
	Culex spp.		3
	Culex spp. (male)	2	7
	Cx. nigripalpus		5
	Cx. quinquefasciatus	5	64
	Cx. salinarius	23	2



DATA BY DISTRICT

District 9-1

District 9-1		trap type				
County	**Species**	**BGS**	**CDC**	**Exit**	**gravid**	**other**
Bryan	*Ae. albopictus*		11			
	Ae. vexans		8			
	Aedes/Ochlerotatus spp.		3			
	An. crucians		7			
	An. punctipennis		4			
	Anopheles spp.		4			
	Culex spp.		8			
	Cx. erraticus		9			
	Cx. nigripalpus		32			
	Cx. salinarius		8			
	Oc. atlanticus		265		19	
	Oc. taeniorhynchus		2			
	Or. signifera		1			
	Ps. ciliata		7			
	Ps. columbiae		63		4	
	Ps. ferox		37			
Camden	*An. crucians*		1			
	An. punctipennis		14			9
	Culex spp.		2			
	Cx. erraticus		6			
	Cx. nigripalpus		38			5
	Cx. quinquefasciatus		4			
	Cx. salinarius		30			
	Oc. atlanticus		14			
	Oc. sollicitans		36			
	Ps. ciliata		2			
	Ps. columbiae		9			
	Ps. ferox		1			2
Chatham	*Ae. albopictus*		10		31	
	Cq. perturbans		102	8	3	
	Cs. melanura		254	59	7	
	Culex spp.		4		10120	

Surveillance in District 9-1 was done by one of the VSCs and by Liberty County, Hinesville, and Chatham County Mosquito Control programs. Surveillance was done from Jan - Dec over 1097 trap nights.

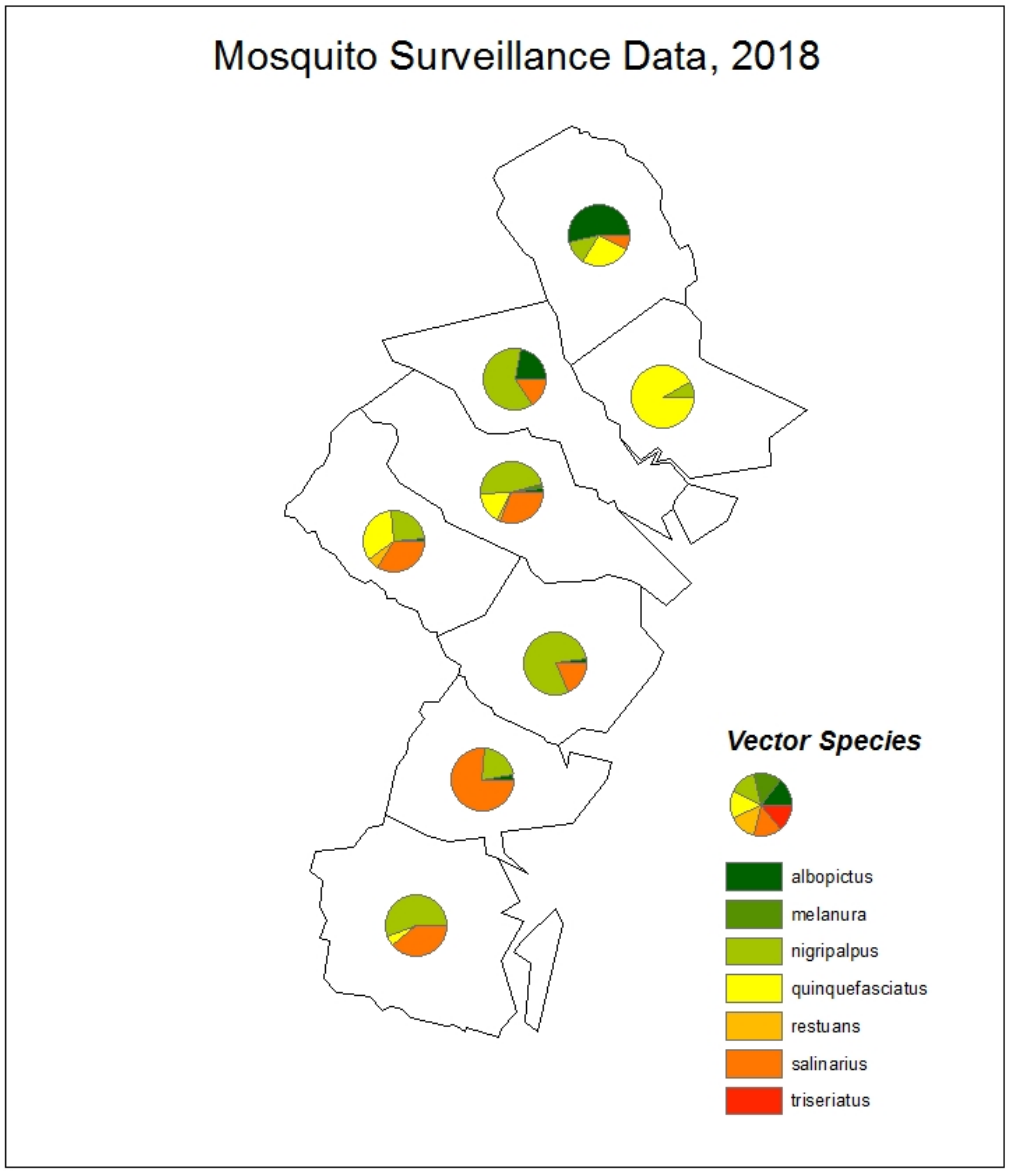
	Cx. coronator		5	1	43	
	Cx. erraticus		1491	18		
	Cx. nigripalpus		2028	342	2391	
	Cx. quinquefasciatus		56		55658	
	Cx. restuans				21	
	Oc. atlanticus		23			
	Oc. infirmatus		16	1		
	Oc. triseriatus		10			
Effingham	*Ae. albopictus*		38		3	
	Ae. vexans		1			
	An. crucians		2			
	Cq. perturbans		1			
	Culex spp.		6			
	Cx. erraticus		20			
	Cx. nigripalpus		10			
	Cx. quinquefasciatus		20			
	Cx. salinarius		4		2	
	Oc. atlanticus		451			
	Ps. ciliata		12			
	Ps. columbiae		14			
	Ps. ferox		2			
	unknown		2			
Glynn	*Ae. albopictus*		14		115	
	Ae. vexans		11		1	
	Aedes/Ochlerotatus spp.		10			
	An. crucians		9			
	Culex spp.		23			
	Cx. nigripalpus		147		87	
	Cx. salinarius		371		227	
	Oc. atlanticus		7			
	Oc. sollicitans		35			
	Ps. columbiae		8			
Liberty	*Ae. albopictus*		35			
	Ae. cinereus		6			
	Ae. vexans		803		13	
	Aedes/Ochlerotatus spp.		80			
	An. crucians		1069		63	

Cs. inornata 14 CDC
Cx. quinquefasciatus
74 CDC
10241 Gravid

	An. punctipennis		143			
	An. quadrimaculatus		15			
	Anopheles spp.		64		4	
	Cq. perturbans		172			
	Cs. melanura		35		1	
	Culex spp.	1	476			
	Cx. coronator		1			
	Cx. erraticus		214			
	Cx. nigripalpus		693		19	
	Cx. quinquefasciatus		250		19	
	Cx. restuans		20			
	Cx. salinarius		483		1	
	Oc. atlanticus	15	802		13	
	Oc. canadensis		5			
	Oc. infirmatus		157			
	Oc. sollicitans		72			
	Oc. taeniorhynchus		15			
	Oc. triseriatus		20			
	Oc. trivittatus		4			
	Or. signifera	1				
	Ps. ciliata		49			
	Ps. columbiae		564			
	Ps. ferox		104			
	unknown		18			
	Ur. sapphirina		17			
Long	*Ae. albopictus*		2			
	Ae. vexans		6			
	An. crucians		45		5	
	An. punctipennis		13			
	Culex spp.		1			
	Cx. nigripalpus		38			
	Cx. quinquefasciatus		42		9	
	Cx. restuans		9			
	Cx. salinarius		52			
	Oc. atlanticus		50		2	
	Oc. sticticus		14			
	Or. signifera		12			

	Ps. ciliata		3			
	Ps. columbiae		32			
	Ps. ferox		14		1	
	unknown		1			
McIntosh	*Ae. albopictus*		8			
	Ae. cinereus		13			
	Ae. vexans		91		3	
	Aedes/Ochlerotatus spp.		6			
	An. crucians		66		16	
	Cq. perturbans		2			
	Culex spp.		9			
	Cx. erraticus		25			
	Cx. nigripalpus		223		23	
	Cx. salinarius		56			
	Oc. atlanticus		156		8	
	Oc. canadensis		7			
	Oc. infirmatus		11			
	Oc. sollicitans		110		7	
	Oc. taeniorhynchus		43		4	
	Oc. triseriatus		3			
	Ps. ciliata		2		3	
	Ps. ferox		3			
	unknown		45			

DATA BY DISTRICT



DATA BY DISTRICT

District 9-2

District 9-2		trap type		
County	**Species**	**CDC**	**gravid**	**other**
Appling	*Ae. albopictus*	7		8
	Ae. vexans	12		
	Aedes/Ochlerotatus spp.	3		1
	An. crucians	9		
	Anopheles spp.	1		
	Culex spp.	21		4
	Cx. erraticus	6		
	Cx. nigripalpus	12		
	Cx. quinquefasciatus	3		
	Oc. atlanticus	9		
	Ps. columbiae	10		
	Ps. ferox	1		
	unknown			2
Atkinson	*Ae. albopictus*	4		
	Ae. vexans	48		
	Aedes/Ochlerotatus spp.	2		
	An. crucians	68	3	
	An. punctipennis	8		
	Anopheles spp.	1		
	Cq. perturbans	44		
	Culex spp.	25	2	
	Cx. coronator	3		
	Cx. erraticus	38		
	Cx. nigripalpus	98		
	Cx. quinquefasciatus	50		
	Cx. salinarius	49		
	Oc. atlanticus	13		
	Ps. columbiae	106	6	
	Ps. ferox	17		
	unknown	8		
	Ur. sapphirina	1		
Bacon	*Ae. albopictus*	17	3	

Surveillance in District 9-2 was done by one of the VSCs and by Mosquito Control Services, which is under contract to Glynn County for mosquito control. Surveillance was done from Jan - Nov over 326 trap nights.

	Ae. vexans	11		
	Aedes/Ochlerotatus spp.	16		
	An. crucians	12		
	An. punctipennis	9		
	Cq. perturbans	26		
	Culex spp.	100		
	Cx. coronator	16		
	Cx. erraticus	69		
	Cx. nigripalpus	134	2	
	Cx. quinquefasciatus	9		
	Cx. salinarius	51		
	Oc. atlanticus	7		
	Oc. infirmatus	2		
	Ps. ciliata	8		
	Ps. columbiae	152		
	Ps. ferox	26		
	unknown	11		
Brantley	*Ae. albopictus*	38	4	
	Ae. vexans	35		
	An. crucians	13		
	An. punctipennis	25		
	Culex spp.	21		
	Cx. nigripalpus	12		
	Cx. quinquefasciatus	25		
	Cx. salinarius	6		
	Oc. atlanticus	6		
	Ps. columbiae	34		
	Ps. ferox	5		
Bulloch	*Ae. albopictus*	183	150	5
	Ae. albopictus (male)	6	45	
	Ae. vexans	400	2	
	Ae. vexans (male)	1		
	Aedes/Ochlerotatus spp.	2		
	An. crucians	175	1	
	An. punctipennis	149		
	An. punctipennis (male)	2		
	Anopheles spp.	32		

	Anopheles spp. (male)	2		
	Cq. perturbans	70		
	Culex spp.	325		
	Culex spp. (male)		7	
	Cx. coronator	36		
	Cx. erraticus	20	2	
	Cx. nigripalpus	154		
	Cx. quinquefasciatus	145	162	
	Cx. quinquefasciatus (male)	1		
	Cx. salinarius	128	3	
	Cx. territans	7	4	
	Cx. territans (male)	1		
	Oc. atlanticus	302	2	
	Oc. fulvus pallens	6		
	Oc. sollicitans	2		
	Oc. sticticus	1		
	Oc. triseriatus	15	4	
	Oc. trivittatus	7		
	Ps. ciliata	28	1	
	Ps. columbiae	39		
	Ps. cyanescens	1		
	Ps. ferox	78		
	Ps. howardii	53	3	
	unknown	4	2	
	Ur. sapphirina	1		
Candler	*Ae. albopictus*	64	7	
	Ae. vexans	30		
	Aedes/Ochlerotatus spp.	3		
	An. crucians	3		
	Anopheles spp.	1		
	Culex spp.	8	9	
	Cx. erraticus	10		
	Cx. nigripalpus	17		
	Cx. quinquefasciatus	102	20	
	Cx. salinarius	6		
	Oc. atlanticus	12		
	Ps. ciliata	4		

	Ps. columbiae	33	3	
	Ps. ferox	15		
Charlton	*Ae. albopictus*	48		
	Ae. vexans	21		
	An. crucians	6		
	An. punctipennis	47	3	
	Anopheles spp.	2		
	Cx. erraticus	11		
	Cx. nigripalpus	23		
	Cx. quinquefasciatus	72	17	
	Cx. salinarius	22		
	Oc. atlanticus	9		
	Ps. ciliata	2		
	Ps. columbiae	13		
	Ps. ferox	3		
	unknown	1		
Clinch	*Ae. albopictus*	12		
	Ae. vexans	9		
	An. crucians	42	3	
	Anopheles spp.	1		
	Culex spp.	12		
	Cx. nigripalpus	11		
	Cx. quinquefasciatus	31		
	Cx. salinarius	27		
	Oc. atlanticus	21		
	Ps. ciliata	25		
	Ps. columbiae	86	9	
	Ps. ferox	51	1	
Coffee	*Ae. albopictus*	12		
	Ae. vexans	14		
	Aedes/Ochlerotatus spp.	6		
	An. crucians	6		
	An. punctipennis	5	3	
	An. quadrimaculatus	1		
	Cq. perturbans	5		
	Culex spp.	9	2	
	Cx. erraticus	18		

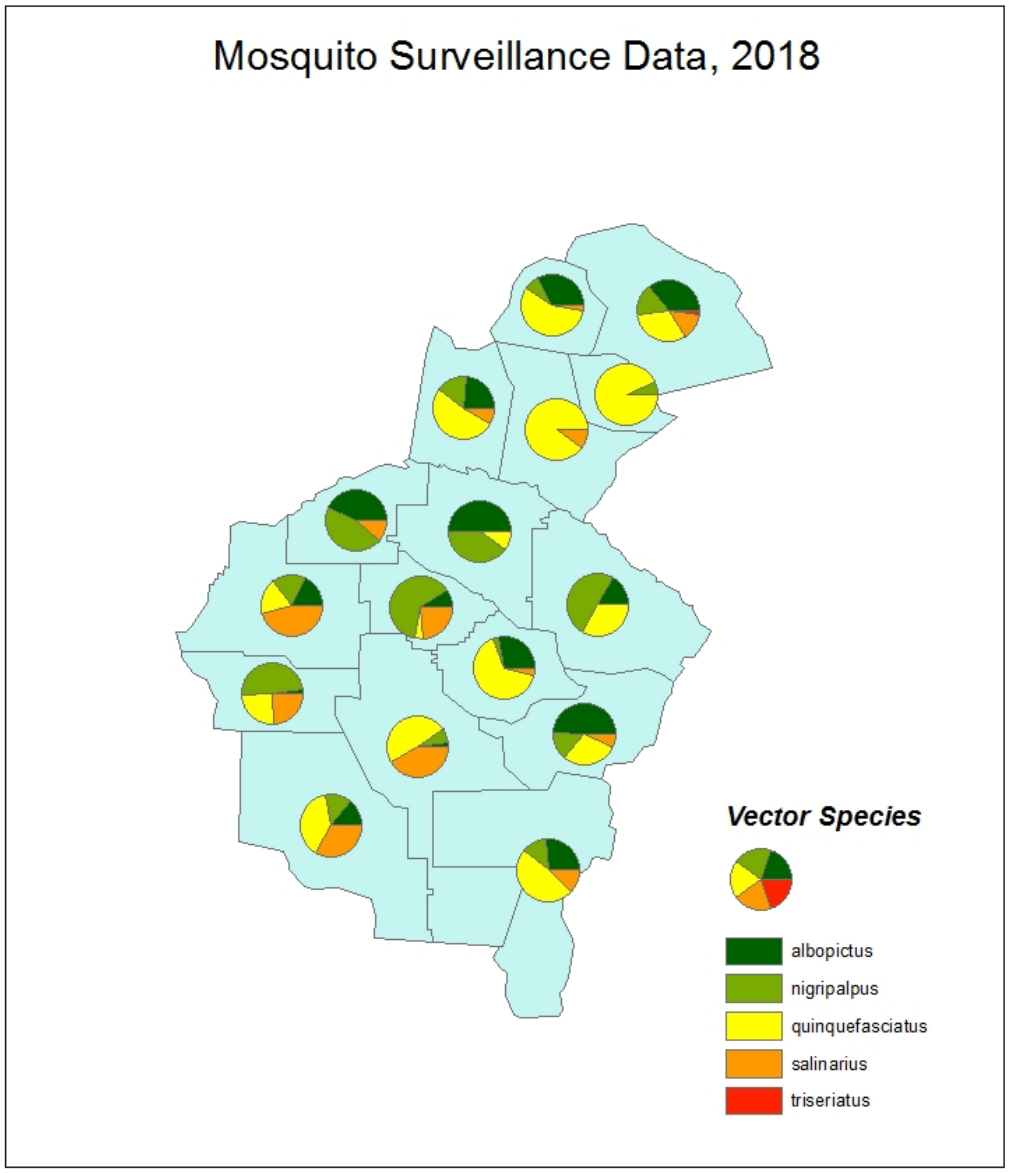
	Cx. nigripalpus	13		
	Cx. quinquefasciatus	13		
	Cx. salinarius	32		
	Oc. atlanticus	3		
	Oc. japonicus	1		
	Ps. ciliata	1		
	Ps. columbiae	24		
	unknown	1		
	Ur. sapphirina	1		
Evans	*An. crucians*	8	1	
	An. punctipennis	1		
	Anopheles spp.	2		
	Cx. coronator	1		
	Cx. erraticus	3		
	Cx. nigripalpus	1		
	Cx. quinquefasciatus	9	4	
	unknown	1		

Jeff Davis	*Ae. albopictus*	15		
	Ae. vexans	26		
	Aedes/Ochlerotatus spp.	2		
	An. crucians	1		
	An. punctipennis	7		
	Anopheles spp.	1		
	Culex spp.		3	
	Cx. nigripalpus	11	5	
	Cx. salinarius	4		
	Oc. atlanticus	3		
	Ps. ciliata	16	6	
	Ps. columbiae	16		
	Ps. ferox	7		
	unknown	2		
Pierce	*Ae. albopictus*	33	4	

	Ae. vexans	84		
	Aedes/Ochlerotatus spp.		2	
	An. crucians	39		
	An. punctipennis	16	4	
	Cx. nigripalpus	4		
	Cx. quinquefasciatus	79	9	
	Cx. salinarius	5		
	Ps. columbiae	12		
Tattnall	*Ae. albopictus*	1		
	Ae. vexans	323	17	
	Aedes/Ochlerotatus spp.	11		
	An. crucians	113	11	
	An. punctipennis	13		
	An. quadrimaculatus	5		
	Cq. perturbans	84	15	
	Cx. quinquefasciatus	87	9	
	Cx. salinarius	11		
	Oc. atlanticus	103		
	Ps. columbiae	20		
	Ps. ferox	2		
	unknown	420	13	
	Ur. sapphirina	1		
Toombs	*Ae. albopictus*	54		
	Ae. vexans	19		
	Aedes/Ochlerotatus spp.	4	2	
	An. punctipennis	16		
	An. quadrimaculatus	1		
	Culex spp.	47		
	Cx. coronator	3		
	Cx. erraticus	46		
	Cx. nigripalpus	33	4	
	Cx. quinquefasciatus	117		
	Cx. salinarius	20		
	Oc. atlanticus	65		
	Oc. infirmatus	2		
	Oc. triseriatus	1		
	Ps. ciliata	83		

	Ps. columbiae	14		
	Ps. ferox	42		
	Ur. sapphirina	4		
Ware	*Ae. albopictus*	2		
	Ae. vexans	62		
	Aedes/Ochlerotatus spp.	9		
	An. crucians	7	1	
	An. punctipennis	38	6	
	Anopheles spp.	1		
	Culex spp.	39		
	Cx. erraticus	2		
	Cx. nigripalpus	6		
	Cx. quinquefasciatus	41		
	Cx. salinarius	35		
	Oc. atlanticus	45	2	
	Ps. columbiae	16		
	Ps. ferox	21		
Wayne	*Ae. albopictus*	9		
	Ae. vexans	3		
	Aedes/Ochlerotatus spp.	17		
	An. crucians	5	1	
	Anopheles spp.	1		
	Cx. erraticus	5		
	Cx. nigripalpus	28		
	Cx. quinquefasciatus	18		
	Oc. atlanticus	6		
	Ps. ciliata	1		
	Ps. columbiae	16		
	Ps. ferox	9		

DATA BY DISTRICT



DATA BY DISTRICT

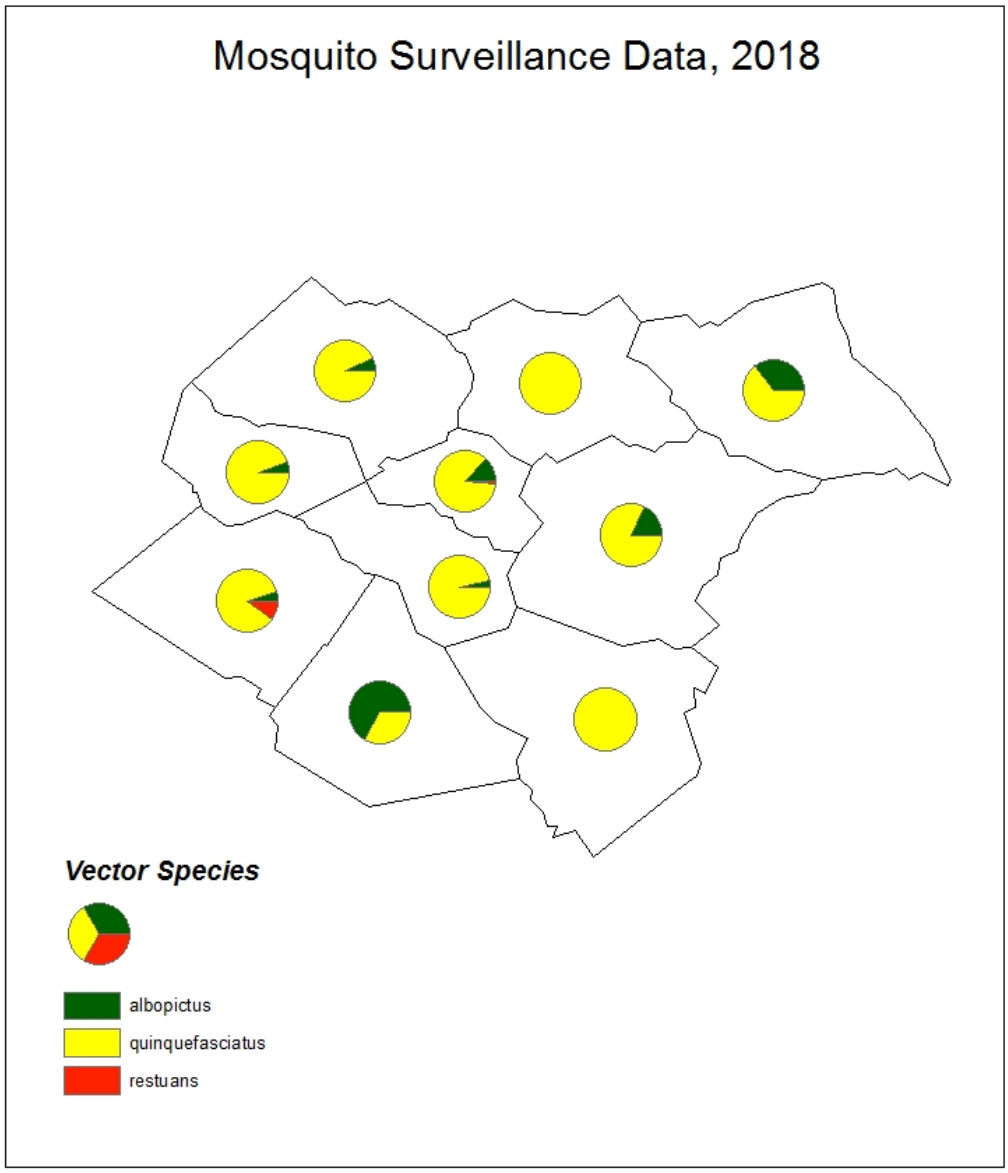
District 10-0

District 10-0		trap type		
County	**Species**	**BGS**	**CDC**	**gravid**
Barrow	*Ae. albopictus*			1
	Ae. vexans			20
	Cx. quinquefasciatus			18
	unknown			3
Clarke	*Ae. albopictus*	37	1	20
	Ae. albopictus (male)	3		3
	Ae. vexans	7		88
	Ae. vexans (male)		1	
	Anopheles spp.			1
	Culex spp. (male)	1	1	8
	Cx. quinquefasciatus	3		374
	Cx. restuans			6
	Oc. japonicus			39
	Ps. ferox			2
	Tx. rutilus	2		
	unknown			19
Elbert	*Ae. albopictus*			6
	Ae. vexans			1
	Culex spp. (male)			1
	Cx. quinquefasciatus			11
Greene	*Ae. vexans*			2
	Cx. quinquefasciatus			20
	Oc. japonicus			2
Jackson	*Ae. albopictus*			2
	Ae. vexans			4
	Cx. quinquefasciatus			28
Madison	*Ae. vexans*			4
	Cx. quinquefasciatus			21
Morgan	*Ae. albopictus*		2	6
	Ae. vexans		2	2
	Cx. quinquefasciatus			4
	Ps. ferox		1	

Surveillance in District 10-0 was done by the local EHS. Surveillance was done from May - Oct over 53 trap nights.

Oconee	*Ae. albopictus*			3
	Ae. vexans			44
	Ae. vexans (male)			1
	Culex spp. (male)			2
	Cx. quinquefasciatus			88
	unknown			5
Oglethorpe	*Ae. albopictus*			5
	Ae. vexans			1
	Anopheles spp.			1
	Cx. quinquefasciatus			23
Walton	*Ae. albopictus*			2
	Ae. albopictus (male)			1
	Cx. quinquefasciatus			34
	Cx. restuans			4

DATA BY DISTRICT



Integrated Mosquito Management

What does mosquito control do to protect the public health? In Georgia, there are ~60 different mosquito species. Each species of mosquito has a different flight range, host preference, larval habitat and potential for carrying and transmitting infectious disease. Any mosquito that bites or annoys people can be considered a health problem, but in Georgia the definition includes mosquitoes that carry infectious diseases like West Nile Virus (WNV), LaCrosse Encephalitis (LAC), and Eastern Equine Encephalitis (EEE), as well as those can transmit new and emerging viruses like Chikungunya and Zika.

The best way to control the mosquitoes in order to reduce the nuisance factor and protect public health is by utilizing a wide variety of control methods known as Integrated Mosquito Management (IMM). The first part of IMM is trapping and surveillance, which help to quantify the numbers, species and location of mosquitoes.

What are the techniques of Integrated Mosquito Management (IMM) program that serve to eliminate the mosquito? If your county has mosquito control, it is usually located in the Public Works Department, but may be in Environmental Health or could be a stand- alone agency. The first response to a mosquito complaint is to send an inspector to find the source of the mosquitoes. Source reduction, also known as physical control, is an important part of IMM. This involves finding and eliminating potential mosquito breeding areas and is typically the most effective and economical of the various techniques used to control mosquitoes.

Mosquitoes need water for their eggs to hatch and for the larvae to survive until adulthood. In areas around a home these sources may include birdbaths, unscreened swimming pools, and old tires, anything that can retain water. This includes hollow stemmed plants like bromeliads. The inspector should educate the homeowner about keeping these items clean and dry, or rinsing them periodically with fresh water.

If the source is a new pond or other permanent- water area that cannot or should not be drained, the inspector may elect to stock it with small, non- descript mosquito-eating fish called Gambusia. Using the mosquito's natural predator to reduce populations is a method of biological control.

Another technique is called larviciding. Larviciding, as the name implies, kills mosquito larvae and pupae using a variety of products, both chemical and biological. This prevents the metamorphosis of the larvae into the flying, biting pests that we know and hate. Larvicide treatments can be applied by ground or air to standing water depending on the size of the area. Different types of larvicides include chemical pesticides that are absorbed or ingested by the larvae, surface control agents that suffocate the pupae, insect growth regulators, and microbial larvicides. Larvicides commonly used in Georgia include microbial larvicides and

insect growth regulators (IGRs). The microbial larvicide consists of two species of the bacterium, Bacillus (Bti and *B sphaericus*), that are toxic when ingested by mosquito and black fly larvae. Methoprene, an IGR, prevents mosquito larvae from molting to the adult stage.

Once adult mosquitoes are on the wing, the only way to control them is to use an adulticide. Using truck-mounted sprayers or aircraft, a condensed plume of ultralow volume (ULV) insecticide is released into the air, which spreads out with the prevailing wind and when it comes into contact with flying mosquitoes, kills them.

Mosquito control may also use a barrier spray to provide the homeowner some temporary relief. This is also one method of controlling day biting mosquitoes. A barrier spray is a coating of pesticide droplets sprayed onto foliage surrounding an area that has been inundated by mosquitoes. This will kill mosquitoes landing in the foliage, and it repels them. It adheres to the underside of the foliage, depriving them of their resting places.

Another technique, thermal fogging, can be used to control day biting mosquitoes or to control mosquitoes in areas where vegetation is dense and ULV does not penetrate.

The amount of chemical used is designed to be target specific, in that it kills mosquitoes without harming anything else. Since most mosquitoes do not fly during the daytime, adulticiding is done at dusk and beyond, and the hours just before dawn, when mosquito activity is at its peak. Additionally, pesticide sprayed by ULV machines during the heat of the day rises and never comes into contact with the mosquitoes, and so is wasted.

It is impossible to completely eradicate the mosquito, so the focus should be on controlling mosquito populations in order to reduce the nuisance factor and protect public health by using all aspects of Integrated Mosquito Management. It is important to remind homeowners that they can also play a role in mosquito control, especially where organized mosquito control is not present. Surveillance can be used to determine if the mosquito is *Aedes albopictus*, the Asian tiger mosquito, or some other species. By standing out in the yard during the day and waiting to see if a small black and silver mosquito comes to bite your legs, it is possible to determine if this species is present. This is the most common nuisance species in Georgia and, unless there have been heavy rains recently or the area is along the coast, the mosquito most likely to come and bite during the day.

Why is this important? This species is a container breeder and does not fly very far from where it lays its eggs. Source reduction is the best means of control. Picking up anything that holds water and disposing of it correctly, refilling bird baths and animal water bowls at least once a week, raking up big leaves, and cleaning gutters will help reduce the populations of this species and other container breeders. Additionally, pools need to be maintained properly as “green” pools breed large numbers of mosquitoes, including the WNV vector. Homeowners can also buy larvicide, both Bti (mosquito dunks) and methoprene (mosquito torpedoes). This

can be applied to standing water to control mosquitoes by killing larvae. As with any pesticide, it is important to follow the label instructions explicitly.

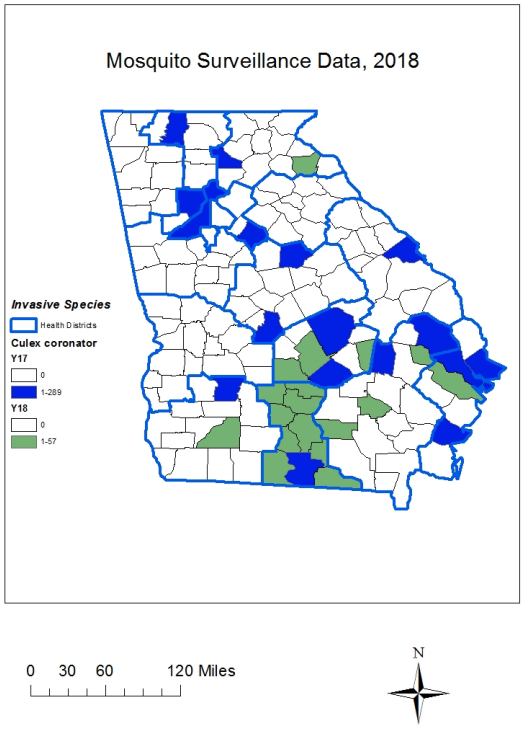
Finally, it is important to wear repellent outside when mosquitoes are biting. Information about the various types of recommended repellents can be found at http://dph.georgia.gov/mosquito-borne-viral-diseases.

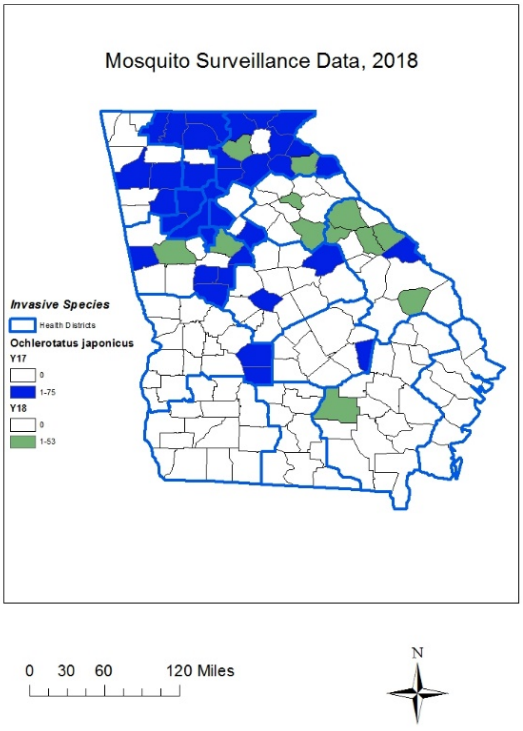
Invasive Mosquito Species

One of the benefits of mosquito surveillance is determining where mosquito species are found. This is especially important for vector species and for invasive species which may become involved in arboviral disease cycle.

Culex coronator was first detected in Georgia in 2006. It was found initially in counties below the Fall line. Mosquito surveillance done in 2017 and 2018 has shown that this species can now be found in most regions of Georgia. It is important to monitor *Cx coronator* as it has the potential to be involved in the WNV cycle.

Ochlerotatus japonicus was first detected in Georgia in 2002. This species lays its eggs in rock pools, so was initially found only above the Fall line. Mosquito surveillance done in 2017 and 2018 has shown that this species can now be found in most regions of Georgia. It is important to monitor *Oc japonicus* as it has the potential to be involved in the WNV cycle.





Conclusions

In 2018, mosquito surveillance was again done in all 159 of Georgia's counties. This is compared to surveillance being conducted in 60 counties in 2016, and only 13 counties in 2015. Surveillance was limited in many counties, but these data add to the 2017 baseline.

Species	BG	CDC	Exit	Gravid	Grand Total
Ae. aegypti		32			32
Ae. albopictus	1072	2701		2302	6075
Ae. albopictus (male)		70		30	100
Ae. cinereus		129			129
Ae. cinereus (male)		14			14
Ae. vexans	1	2563		727	3291
Ae. vexans (male)		4			4
Aedes/Ochlerotatus spp.	6	213		24	243
An. crucians		1031		199	1230
An. punctipennis	1	938		137	1076
An. punctipennis (male)		24			24
An. quadrimaculatus	1	61		12	74
Anopheles spp.		157		29	186
Anopheles spp. (male)		20		8	28
Cq. perturbans		1767		53	1820
Cs. inornata		9		3	12
Cs. melanura		1938	128	73	2139
Culex spp.		1475		7890	9365
Culex spp. (male)		6		30	36
Culiseta spp.		12			12
Cx. coronator		474		65	539
Cx. coronator (male)		3			3
Cx. erraticus	14	2006	29	152	2201
Cx. erraticus (male)		10			10
Cx. nigripalpus		19019		7580	26599
Cx. quinquefasciatus	312	4308		80730	85350
Cx. quinquefasciatus (male)		1		6	7

Cx. restuans	7	81		372	460
Cx. salinarius	7	3728		4219	7954
Cx. territans		47		22	69
Cx. territans (male)		1			1
Ma. dyari		3			3
Ma. titillans		217		27	244
Oc. atlanticus	1	297			298
Oc. canadensis		1			1
Oc. fulvus pallens		39			39
Oc. infirmatus		74			74
Oc. japonicus	1	202		173	376
Oc. mitchellae		8			8
Oc. sollicitans		30			30
Oc. sticticus		36			36
Oc. taeniorhynchus		488			488
Oc. thibaulti		1		1	2
Oc. triseriatus	11	28		35	74
Oc. trivittatus		492		5	497
Oc. trivittatus (male)		2			2
Or. signifera	1	100		16	117
Ps. ciliata	1	45			46
Ps. columbiae	1	217		7	225
Ps. cyanescens		99			99
Ps. cyanescens (male)		1			1
Ps. discolor		5			5
Ps. ferox	4	282		40	326
Ps. howardii		6			6
Ps. howardii (male)		3			3
Ps. mathesoni		9			9
Psorophora spp.		9			9
Tx. rutilus	11	1		9	21
unknown	12	161		253	426
Ur. lowii		2			2
Ur. sapphirina		40		3	43
Grand Total	1464	45740	157	105232	152593

CONCLUSIONS

Year	# counties doing surveillance	% of counties
2001	2	1.3%
2002	11	6.9%
2003	26	16.4%
2004	56	35.2%
2005	55	34.6%
2006	28	17.6%
2007	28	17.6%
2008	28	17.6%
2009	26	16.4%
2010	22	13.8%
2011	19	11.9%
2012	12	7.5%
2013	13	8.2%
2014	15	9.4%
2015	13	8.2%
2016	60	37.7%
2017	159	100.0%
2018	159	100.0%

This level of surveillance was only possible through the combined effort of State, District, and County Environmental Health, as well as assistance from several other agencies.

Our goals for the 2019 mosquito surveillance season include:

- Doing some level of mosquito surveillance in every county in Georgia again
- Doing targeted surveillance in areas where *Ae aegypti* were found in the 1950s
- Providing equipment and training to Environmental Health Specialists in all 18 Public Health Districts
- Having the ability to support local outreach for mosquito complaints
- Continue doing testing for pesticide resistance, esp in high risk areas of Georgia

The accomplishment of these goals will allow the Georgia Department of Public Health to be better prepared for the next mosquito-borne disease to emerge.

Pesticide Resistance Testing

Statewide Insecticide Resistance Testing of Mosquitoes in Georgia

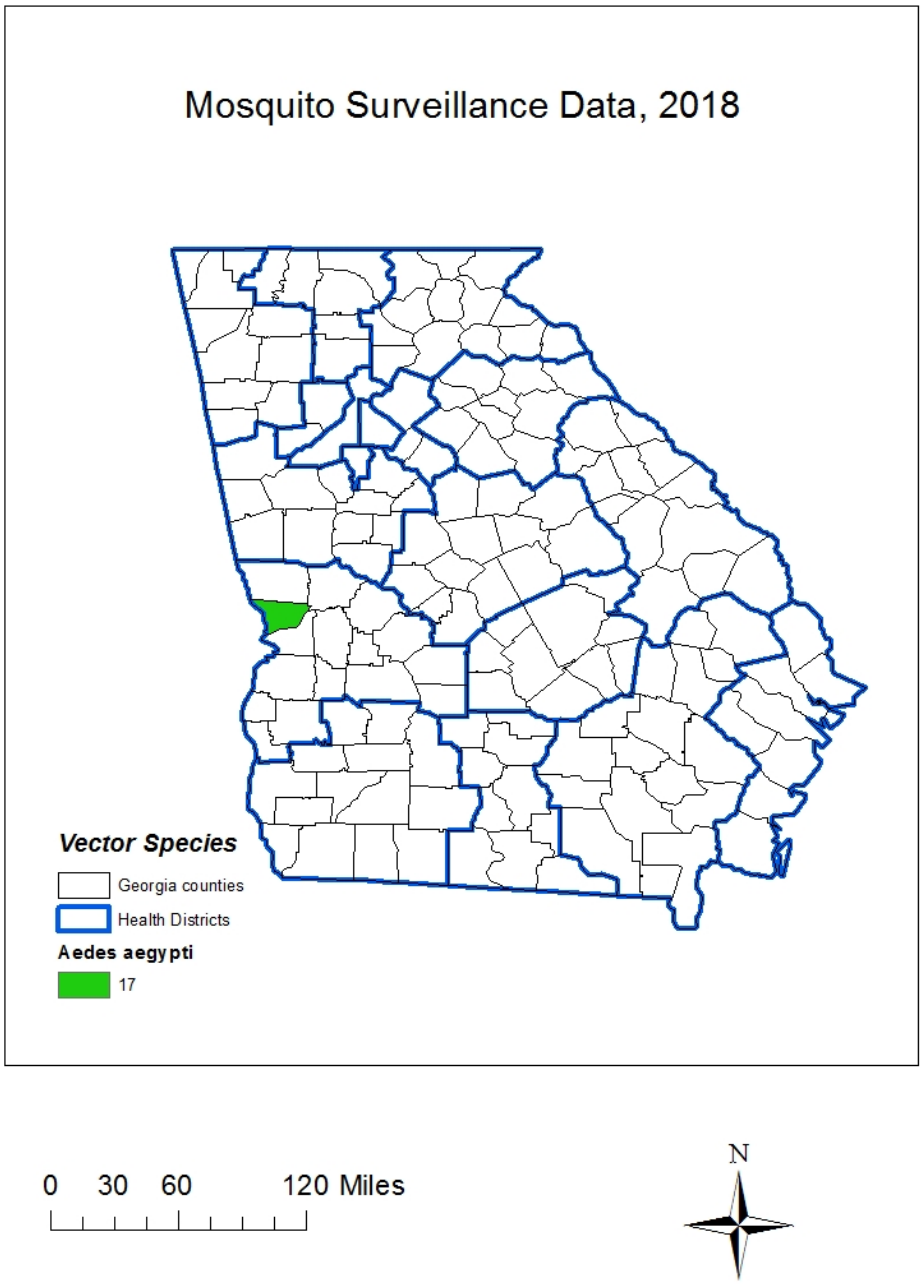
With the continuation of positive human cases of arboviral diseases such as La Crosse Encephalitis, St. Louis Encephalitis, Eastern Equine Encephalitis, and West Nile Virus in Georgia in 2018, mosquito control methods are critical. Pesticide Resistance has been found to be a component for ineffective mosquito control. There is a lack of insecticide resistance studies conducted statewide in Georgia and minimal knowledge of which pesticides mosquitoes are resistant to.

The state entomologists and regional entomologist are tasked to conduct insecticide resistance testing in all high-risk urban regions of Georgia for the next two years. Mosquito egg collections were performed by Vector Surveillance coordinators and Environmental Health specialists around the state. Mosquito egg collection training will be included during the Adult Mosquito Identification class April 15-16, 2019 in Albany, GA.

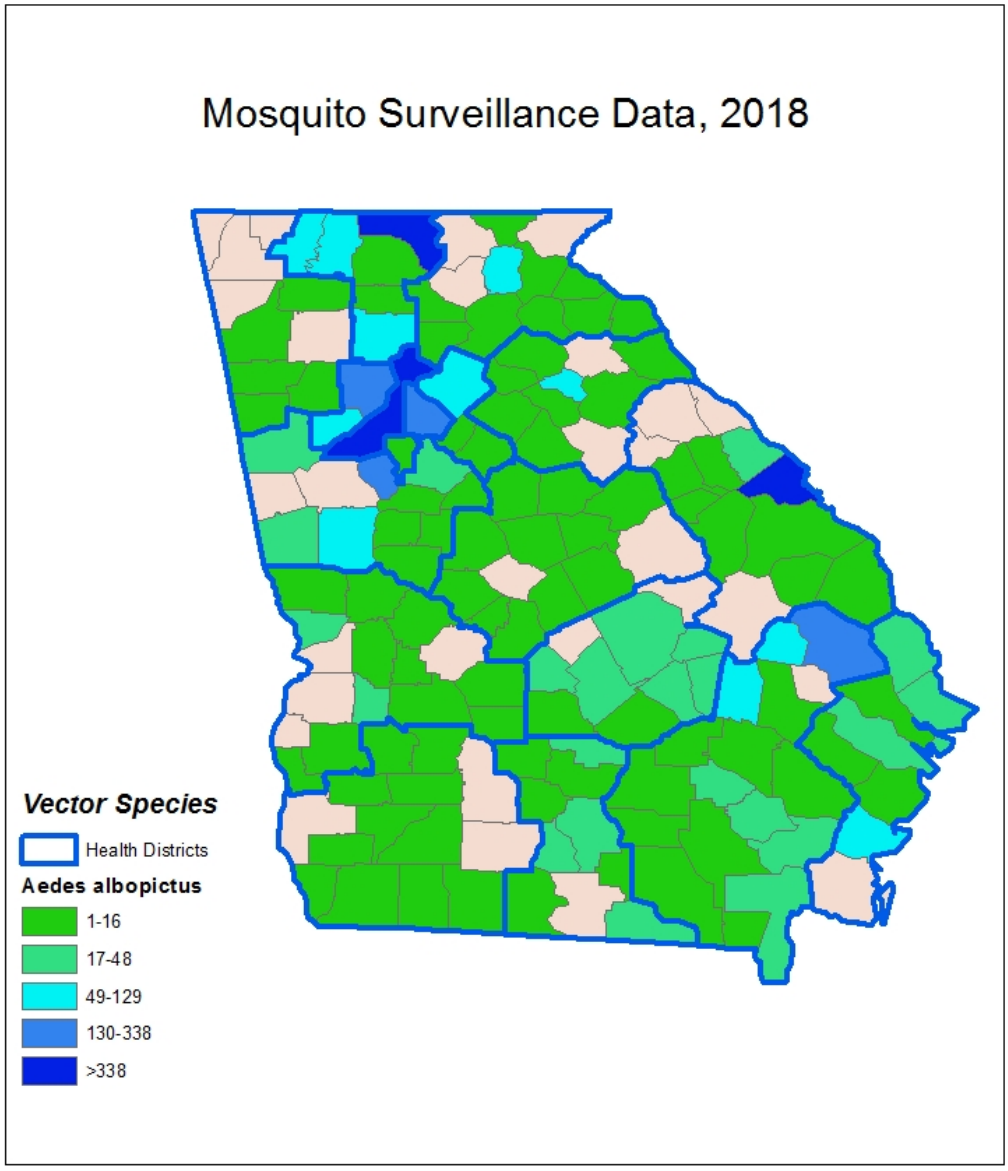
Resistance testing is performed using the CDC Bottle Bioassay procedure and the chemicals that were provided in the CDC Bottle Bioassay kits. Preliminary data from several southern counties showed *Aedes albopictus* to be susceptible to permethrin, but *Culex quinquefasciatus* showing varied levels of resistance to both permethrin and lambda cyhalothrin. Further testing with mosquitoes from more high-risk counties around the state will be tested with a greater diversity of chemicals in 2019.

With the implementation of the first statewide pesticide resistance testing program, a clearer picture of the type of mosquitoes and their resistance to specific pesticides commonly used in Georgia will be determined. This information enables DPH to advise and train current mosquito control operators in using the most effective and cost-efficient pesticide for their target-mosquito. The statewide pesticide resistance testing program is a major component in reducing the exposure of mosquito-borne disease risk to the public.

Maps – Important Vector Species



MAPS – IMPORTANT VECTOR SPECIES



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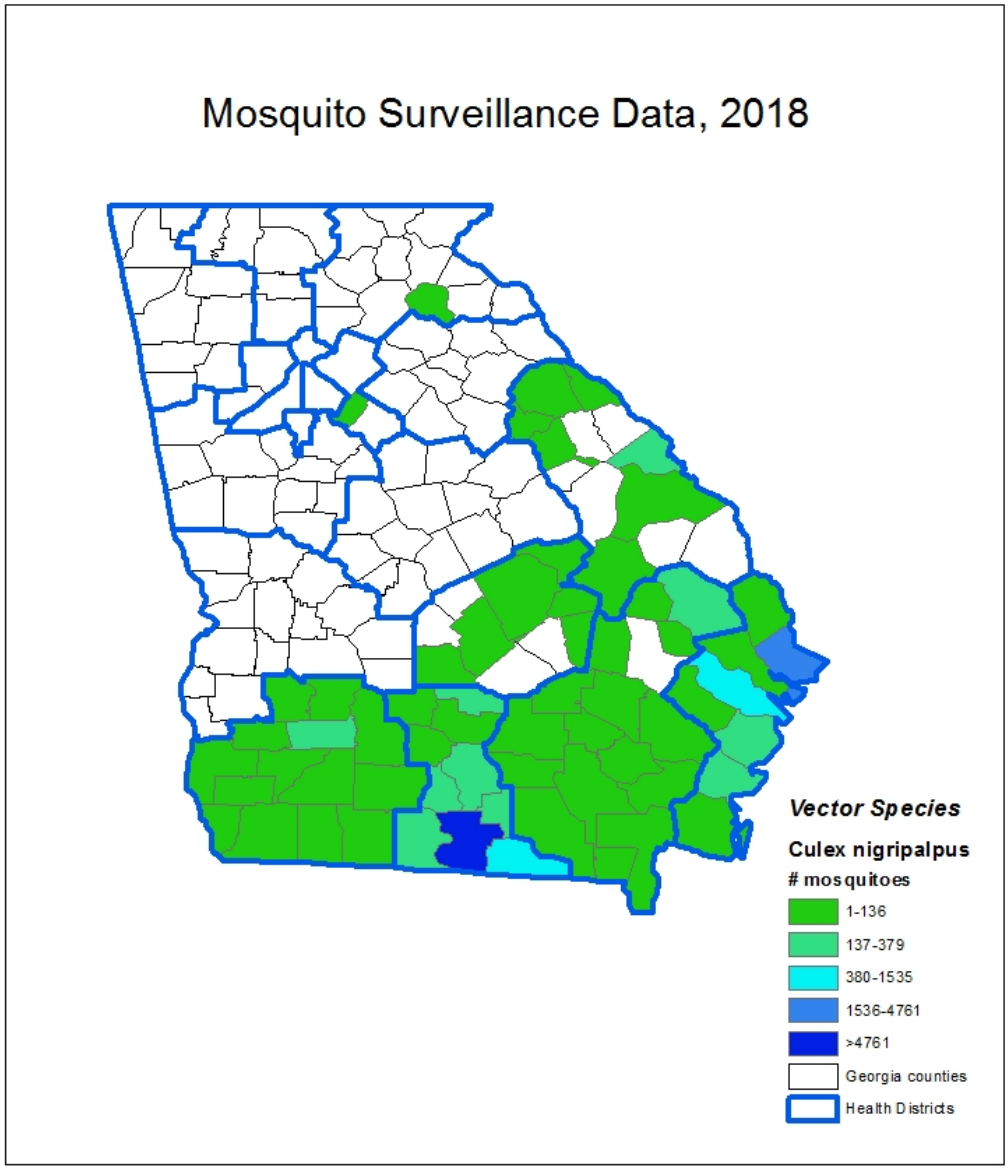

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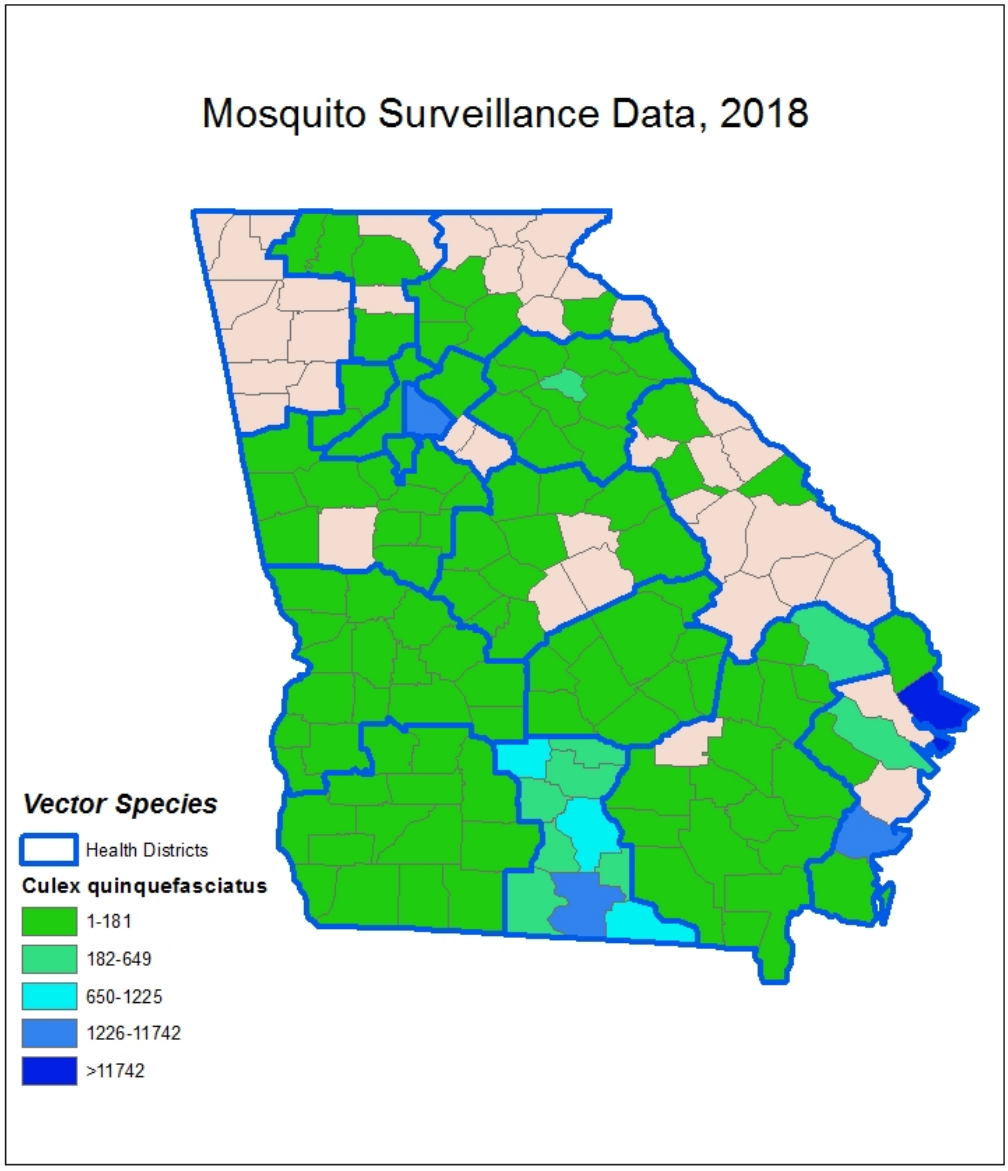

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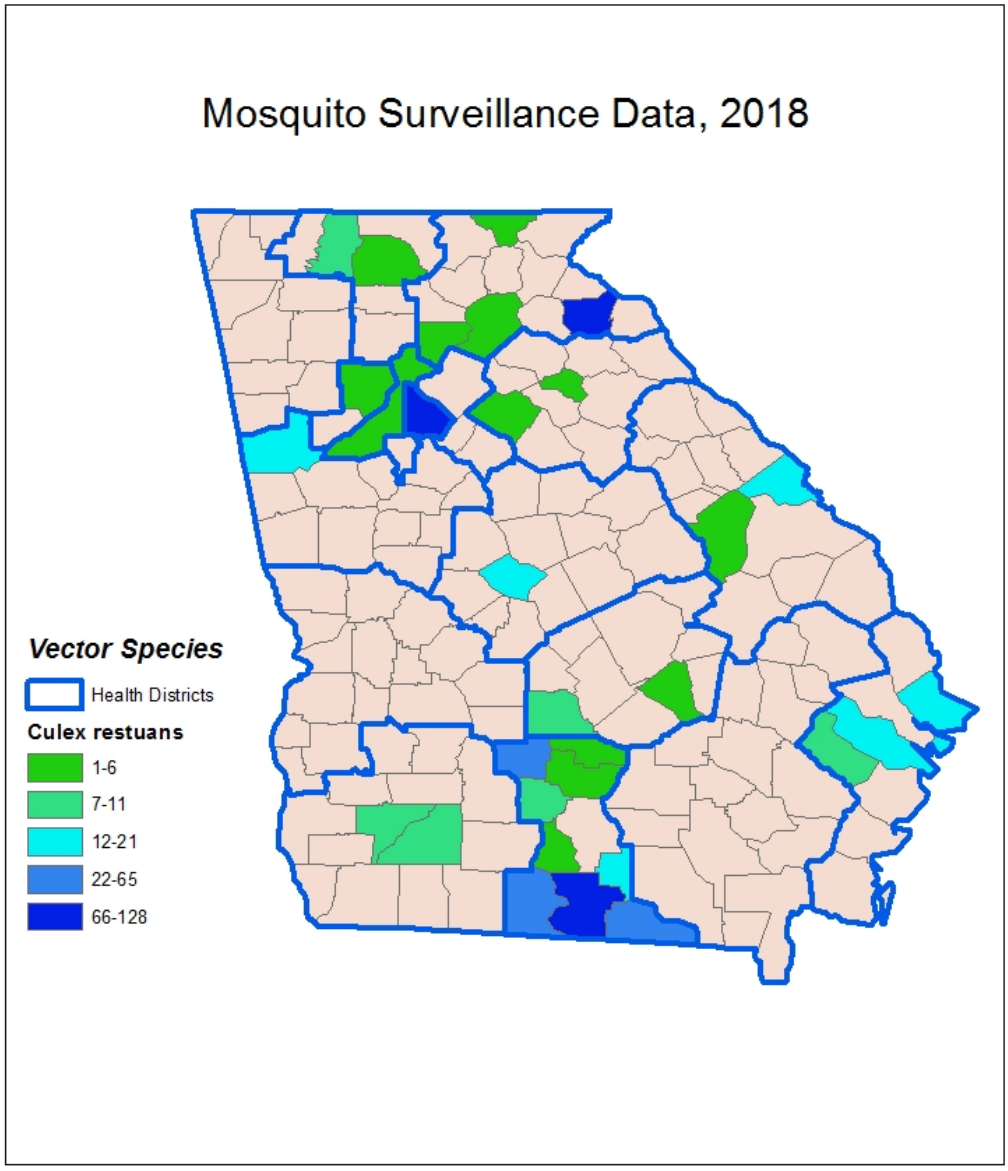

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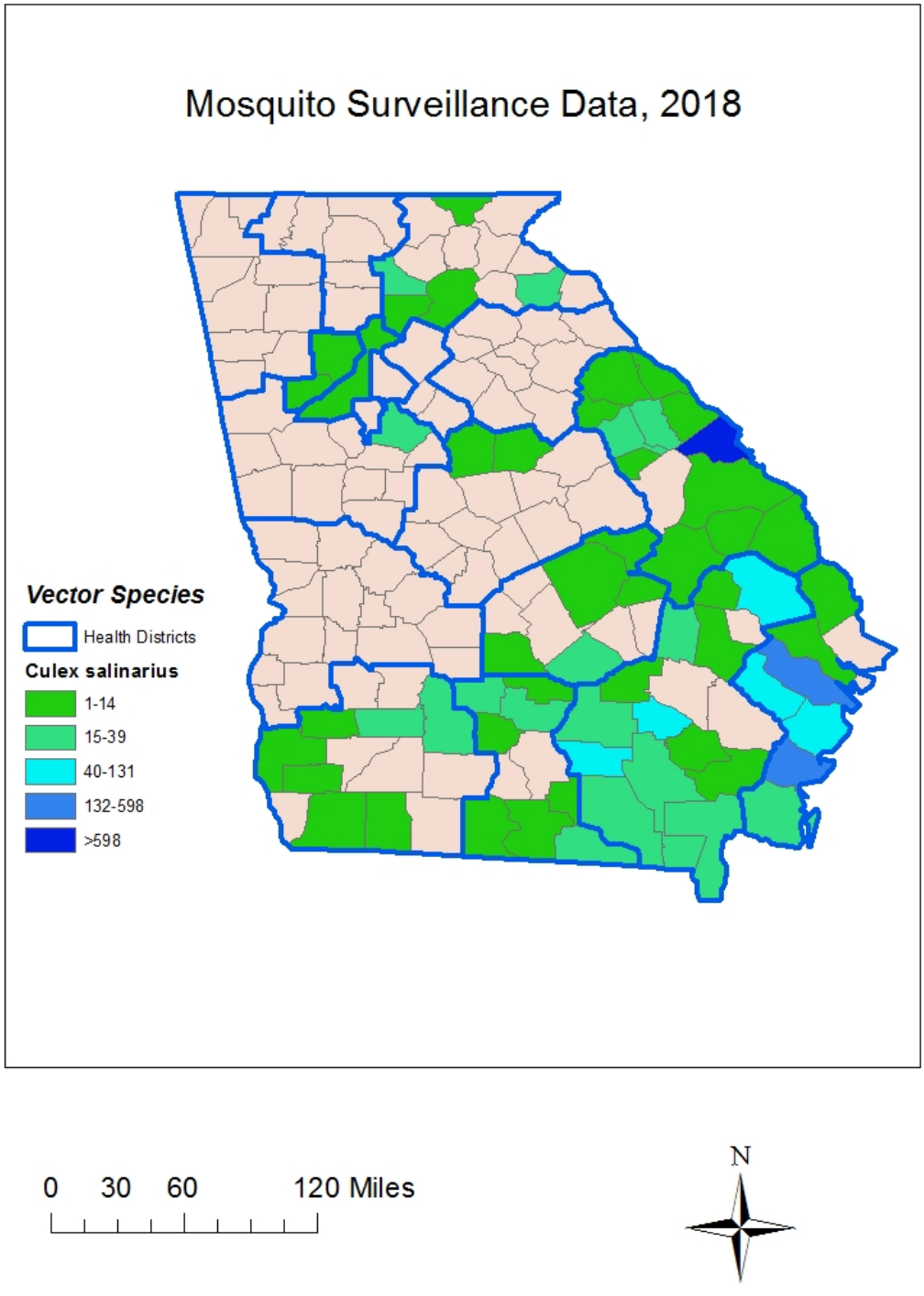

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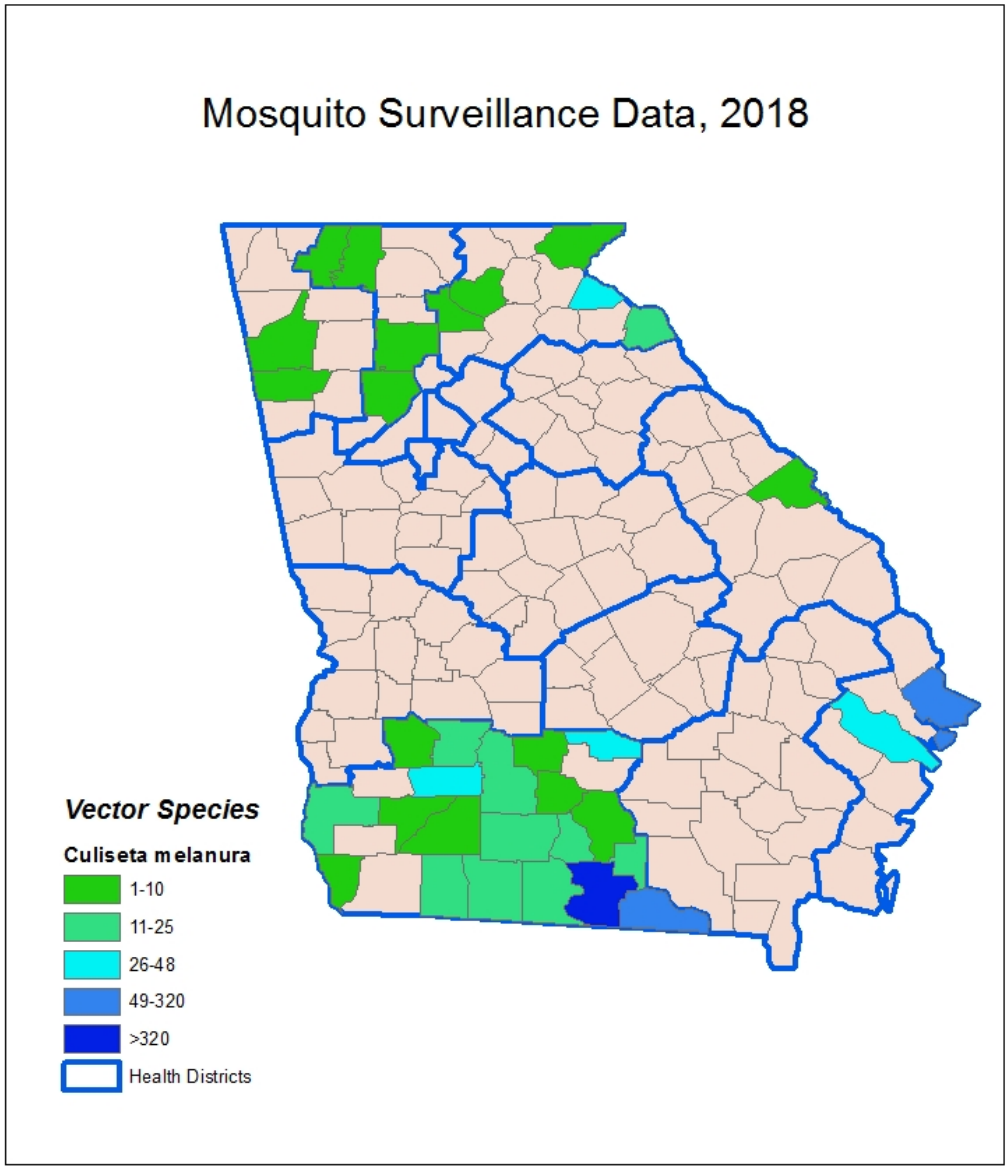
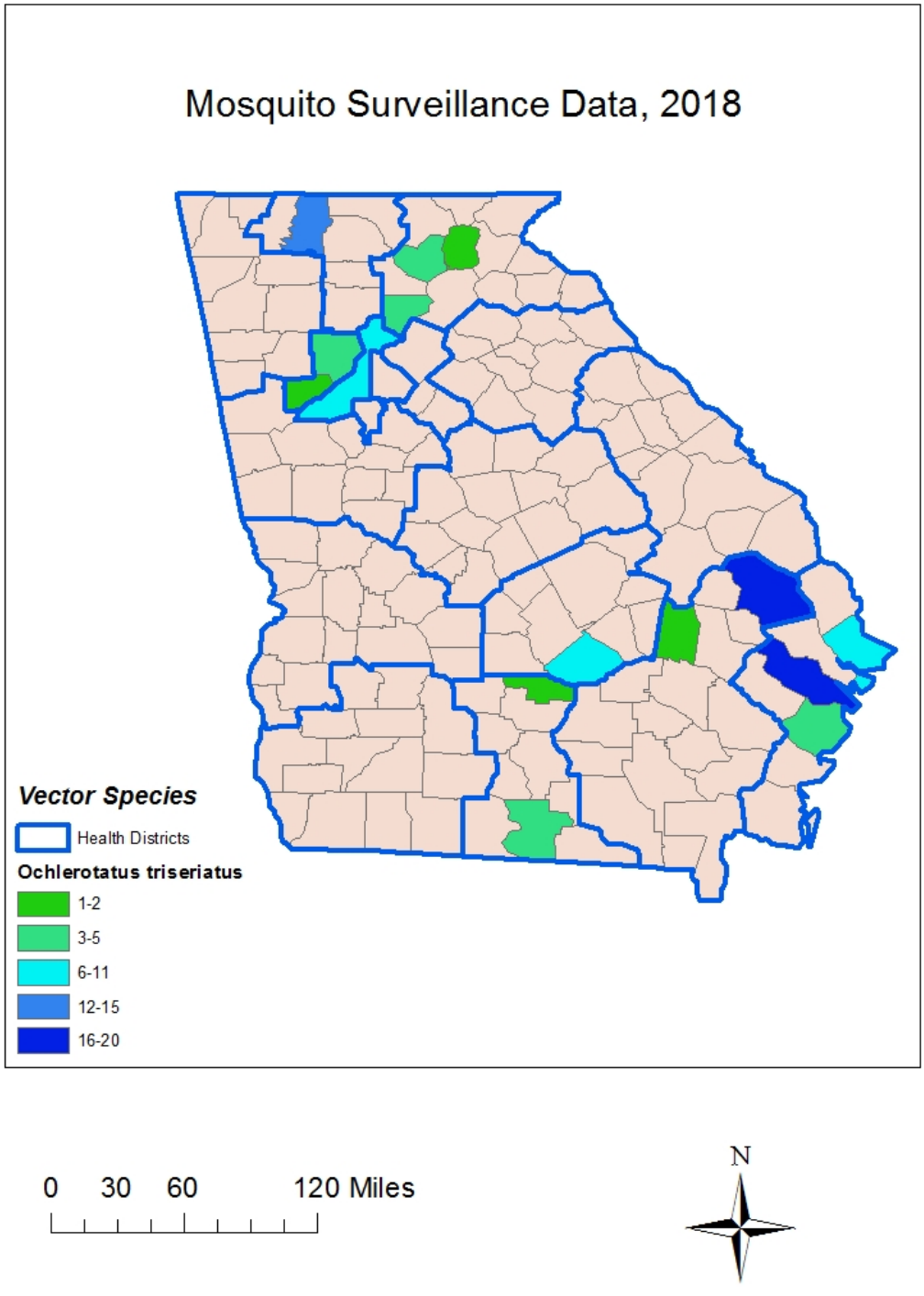


MAPS – IMPORTANT VECTOR SPECIES



RESOURCES

Resources

https://mosquito.site-ym.com/page/control

https://c.ymcdn.com/sites/mosquito.site-ym.com/resource/resmgr/docs/Resource_Center/Mosq_Control_Facts/Best_Practices_Mgmt/amca_guidelines_final_pdf.pdf

http://www.gamosquito.org/publications.htm

http://cdcsercoevbd-flgateway.org/

https://www.cdc.gov/parasites/education_training/lab/bottlebioassay.html

Acknowledgements

I would like to thank everyone who assisted with this mosquito surveillance project, at the State, District, and County Public Health levels, as well as the mosquito control programs that contributed data.