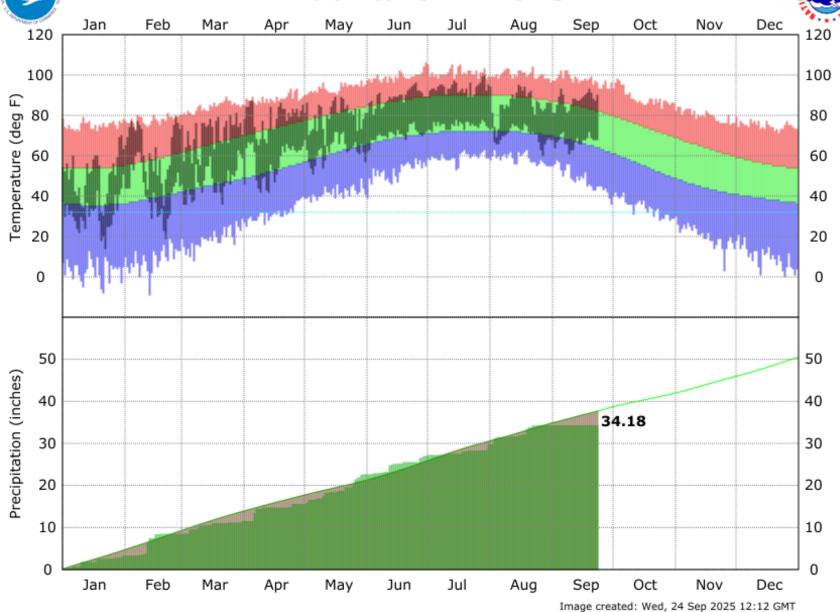
### Georgia Vector Surveillance State Report, 2025

GMCA Annual Meeting Tiffany Thuy-Vi Nguyen, PhD, MPH 16 Oct 25



### Atlanta GA - 2025



# Mosquito Species, 2025

ALL SPECIES					
Species	Total	Oc. canadensis	279		
Ae. aegypti	43	Oc. dupreei	118		
Ae. albopictus	2326	Oc. infirmatus	451		
Ae. vexans	3497	Oc. japonicus	78		
An. crucians	1229	Oc. sollicitans	1203		
An. punctipennis	126	Oc. sticticus	34		
An. quadrimaculatus	227	Oc. taeniorhynchus	2702		
Cq. perturbans	3403	Oc. triseriatus	104		
Cs. inornata	14	Oc. trivittatus	1		
Cs. melanura	138	Or. signifera	8		
Cx. coronator	155	Ps. ciliata	54		
Cx. erraticus	7853	Ps. columbiae	124		
Cx. nigripalpus	4724	Ps. cyanescens	17		
Cx. quinquefasciatus	92484	Ps. ferox	614		
Cx. restuans	1600	Ps. howardii	1		
Cx. salinarius	20846	Ps. mathesoni	4		
Ma. titillans	17	Tx. rutilus	1		
Oc. atlanticus	4014	Ur. sapphirina	19		

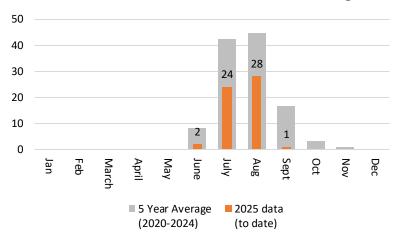


A total of 35 species from 10 genera have been collected to date.

# Mosquitoes – Tested (to date)

- We continue to work with limited funding
- Mosquitoes have been tested from 10 counties
  - 5 counties have reported WNV+ mosquitoes
  - 1 county has reported EEE+ mosquitoes

# 2025 Georgia WNV+ Mosquitoes Relative to the 2020–2024 Five-Year Average



#### WNV+ Mosquito Pools

County	Aedes albopictus	Culex quinquefasciatus	Culex restuans	Culex nigripalpus
Chatham		2		
DeKalb		14	2	
Fulton	1	20		
Glynn		4		1
Lowndes		11		

**EEE+ Mosquito Pools** 

County	Cx. quinquefasciatus
Fulton	2

### Minimum Infection Rates

County	# mosquitoes submitted	# pools tested	# WNV+ pools	WNV MIR	# EEE+ po ols	EEE MIR
Ben Hill	50	1				
Camden	7963	1574				
Chatham	83665	2997	2	0.02		
DeKalb	7303	399	16	2.05		
Fulton	9679	421	21	2.17	2	0.20
Glynn	10541	1445	5	0.47		
Irwin	7	1				
Lowndes	5675	357	11	1.94		
Tift	43	1				
Turner	41	1				

The Minimum Infection Rate or MIR = (# WNV+ Pools/Total # Mosquitoes Tested) X 1000.

MIR of 0 - no viral activity detected in the area

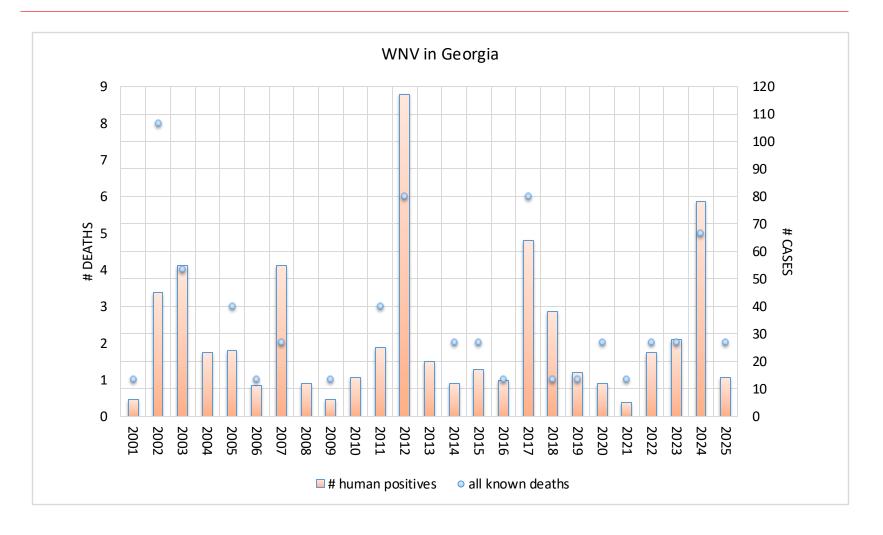
MIR of 0.1 to 3.9 - some viral activity is present, increased vigilance and testing are needed

MIR of 4.0 or above - high level of viral activity is present, human infections are imminent (if not already present), and prompt action is required

# Arboviral Surveillance 2001-2025

year	WNV+ pools	EEE+ pools	counties doing surveillance	# counties testing	# WNV+ counties	total mosquito pools tested	% WNV+	Human WNV+
2001	30		2	2	1	597	5.03%	6
2002	91		11	11	6	4032	2.26%	36
2003	106	1	26	26	6	6177	1.72%	55
2004	126	2	56	56	7	10161	1.24%	23
2005	67	8	55	55	5	15248	0.44%	24
2006	81		28	28	5	4785	1.69%	11
2007	75		28	28	7	6513	1.15%	55
2008	51	1	28	28	4	6383	0.80%	12
2009	24		26	26	4	4446	0.54%	6
2010	99	3	22	22	5	5990	1.65%	14
2011	438		19	19	8	7622	5.75%	25
2012	125	3	12	6	5	6042	2.07%	117
2013	166	1	13	6	6	7453	2.23%	20
2014	56	2	15	6	4	5038	1.11%	13
2015	40		13	6	3	3366	1.19%	15
2016	36		60	6	2	5620	0.64%	13
2017	276	2	159	5	4	6419	4.30%	63
2018	310	3	159	6	5	6598	4.70%	38
2019	243		159	12	5	5532	4.39%	16
2020	59		142	9	4	6025	0.98%	12
2021	31	1	103	16	5	7357	0.42%	5
2022	100	2	79	14	5	3611	2.77%	23
2023	118	1	101	7	4	7110	1.66%	28
2024	256	4	78	16	3	9281	2.76%	78
2025*	55	2	61	10	5	7265	0.74%	14

### WNV+ Humans 2001-2025



mean #positives = 29.3 mean #deaths = 2.2

# Arboviral Surveillance – Human Positives, 2025

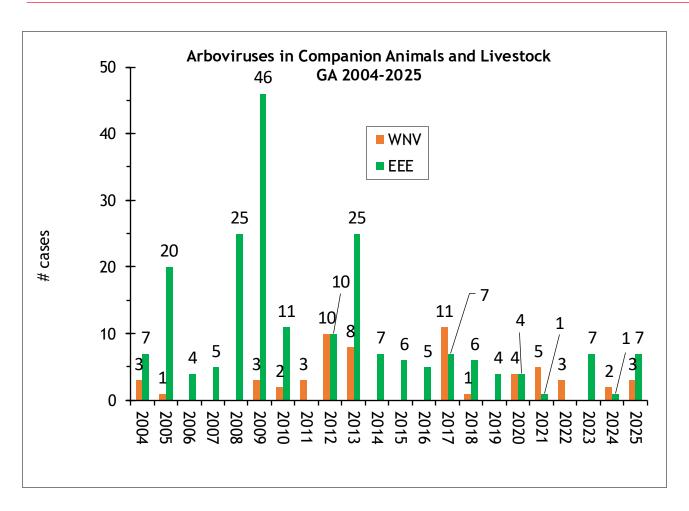
# cases (including asymptomatic), 2025					
District	CS (LAC)	EEE	WNV	TOTAL	
1-1				0	
1-2				0	
2-0			1	1	
3-(1,2,3,4,5)	1		2	3	
4-0			1	1	
5-1				0	
5-2			3	3	
6-0			2	2	
7-0			1	1	
8-1			2	2	
8-2			1	1	
9-1			1	1	
9-2				0	
10-0				0	
TOTAL	1	0	14	15	

clinical	# cases	%
Acute Flaccid Paralysis		0%
Asymptomatic	3	21%
Febrile illness		0%
Meningitis	1	7%
Other Neuroinvasive Presentation	2	14%
Guillain-Barre Syndrome	1	7%
Encephalitis - Including Meningoencephalitis	7	50%
Other Clinical		9%
WNV		
Female	3	21%
Male	11	79%

# Clinical Syndromes, 2025

Virus	Month	Clinical Syndrome	Fatality	# cases
	Feb	Guillain-Barre Syndrome		1
		Asymptomatic		1
	July	Encephalitis - Including Meningoencephalitis		2
		Other Neuroinvasive Presentation		1
WNV		Asymptomatic		1
	Aug	Encephalitis - Including		3
	Aug	Aug Meningoencephalitis	yes	2
		Other Neuroinvasive Presentation		1
	Con	Asymptomatic		1
	Sep	Meningitis		1

### Veterinary Arboviral Positives, 2001-2025



year	WNV	EEE
2001	64	
2002	175	1
2003	60	80
2004	3	7
2005	1	20
2006		4
2007		5
2008		25
2009	3	46
2010	2	11
2011	3	
2012	10	10
2013	8	25
2014		7
2015		6
2016		5 7
2017	11	7
2018	1	6
2019		4
2020	4	4
2021	5	1
2022	3	
2023		7
2024	2	1
2025	3	7

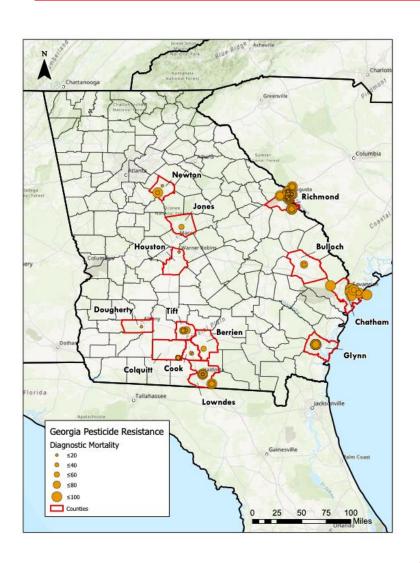
There have been no positive birds reported in 2025. There has been 1 EEE+ sentinel chicken reported in 2025.

# Pesticide Resistance Testing

Pesticide resistance has been found to be a component of ineffective mosquito control.

- The state entomologists were tasked by the CDC, through the Hurricane Crisis CoAG grant, to conduct pesticide resistance testing in all high-risk urban regions of Georgia for the period of the grant.
  - o Collaborators include:
    - Environmental Health Specialists around the state who conduct mosquito egg collections.
    - Mosquito control technicians from Chatham and Glynn counties who conduct their own resistance testing.
- The statewide pesticide resistance testing program is a major component in reducing the exposure of mosquito-borne disease risk to the public.
- Even though the funding period has ended, DPH continues to do pesticide resistance testing, although at a more restricted level.

# Insecticide Resistance Testing



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 central and southern counties showed *Ae albopictus* to be exhibiting varied levels of resistance to permethrin and deltamethrin but were susceptible at varied levels to bifenthrin and deltamethrin used along with the synergist, PBO.

Culex quinquefasciatus showed varied levels of resistance to permethrin, lambda cyhalothrin, and deltamethrin; they were susceptible to malathion.

# Tick Surveillance on a Limited Budget



Surveillance for ticks has rarely been undertaken in by the Georgia Department of Public Health, even where tick-borne diseases have been reported.

- Tick surveillance is intended to monitor changes in the distribution and abundance of ticks.
- While several short-term attached tick studies have been completed, no surveillance for presence and prevalence have been undertaken due to limited funding.

# Types of Tick Surveillance

#### **Drag/Flag Sampling**

Many adult ixodid ticks can be collected while questing for hosts from the vegetation. Dragging or flagging is done with a 1 m<sup>2</sup> piece of white cotton flannel attached to a 1.5 m wooden dowel. Dragging is more effective in more open areas, where a greater surface area of material would contact the tick environment. Flagging, where the flannel is waved back and forth under, in, and around vegetation or leaf litter works better in heavy vegetation. These data can be used to determine tick densities.

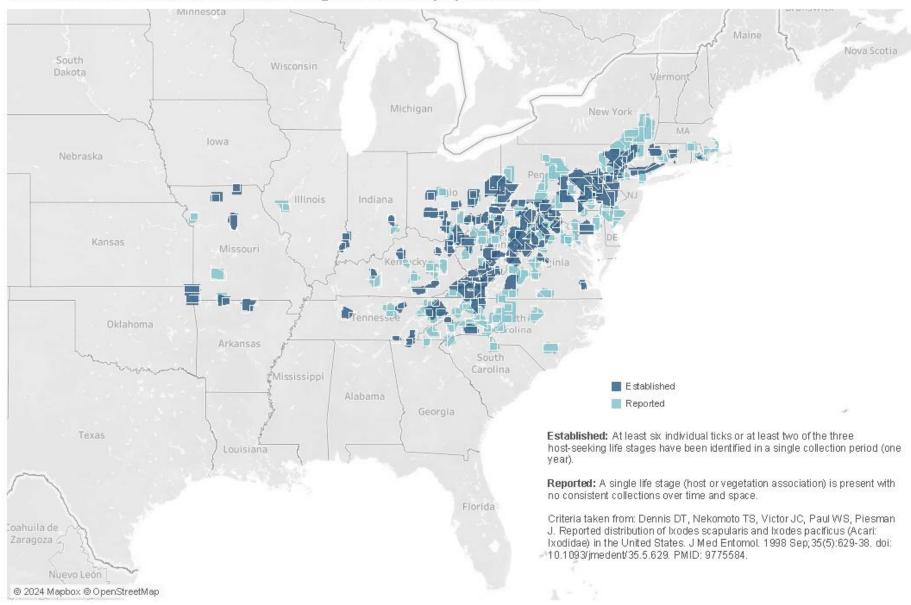
#### **Carbon Dioxide Trapping**

To construct a CO<sup>2</sup> trap, simply place some dry ice in a vented, insulated container and set the container in the center of a sheet or board on the ground. If the trap will not be monitored, tape can be attached, sticky side out, on the perimeter to capture attracted ticks. A half-pound of dry ice will last about 2 hours at 80°F in an insulated container.

#### Live/Dead Host Collection

This is a passive method of tick collection that can provide useful information on the presence and abundance of ticks. Ticks collected from hosts should only be included in assessments of county status when travel history is considered.

#### Counties with established Asian longhorned tick populations

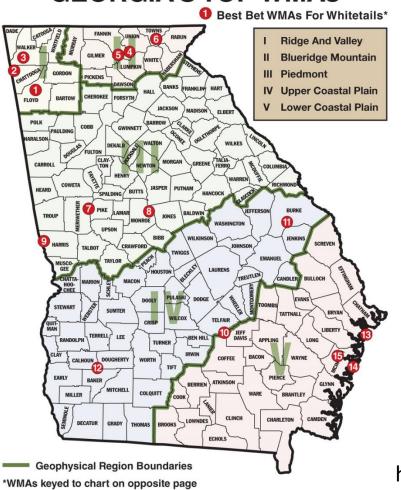




These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperators on APHIS' behalf, for restricted government purposes only. This information is the sole property of APHIS. See full disclaimer here: aphis.usda.gov/help/map-disclaimer.

# Wildlife Management Areas (WMAs)

#### **GEORGIA'S TOP WMAs**



WMAs are special places, acquired and managed to: provide quality wildlife habitat; foster wildlife reproduction and survival; promote wildlife-dependent recreation and enjoyment-including hunting, trapping, wildlife observation and photography; and protect soil and water quality. Wildlife Management Areas provide and protect natural habitats that are particularly significant in their capacity to host unusual concentrations of one or more wildlife species; provide important resting and feeding areas for migratory birds or other wildlife; harbor rare, threatened, or endangered species; or provide significant value for wildlife or human enjoyment of wildlife.

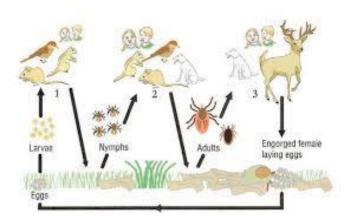
https://georgiawildlife.com/allwmas

# Tick Surveillance at Wildlife Management Areas

We have a collaborative effort with the Georgia Department of Natural Resources (GA DNR) to collect ticks during quota hunts at the Wildlife Management Areas (WMAs).

- In 2020, we attended 9 quota hunts at 2 different WMAs to check deer brought in for tagging for ticks.
- In 2021, we attended 11 quota hunts at 5 different WMAs to check deer and bear brought in for tagging for ticks.
- In 2022 & 2023, we attended 22 quota hunts at 15 different WMAs to check deer and bear brought in for tagging for ticks.
- In 2024, with the help of multiple interns and DNR techs, surveillance was done at 22 WMAs in all 5 geophysical regions in Georgia.





### Tick Surveillance at Wildlife Management Areas

- 2020 Cedar Creek and Clybel
- 2021 BF Grant, Rum Creek, Oaky Woods, Clybel and Cedar Creek
- 2022 & 2023 Chattahoochee/Chestatee, Dawson Forest, Cooper's Creek, Blue Ridge, Lake Russell, Fort Yargo, Tugaloo State Park (SP), War Woman, Richard B Russell SP, Swallow Creek, BF Grant, Rum Creek, Oaky Woods, Clybel, and Cedar Creek
- 2024 Chattahoochee/Chestatee, Lake Russell, Dawson Forest, Cooper's Creek, Blue Ridge, Fort Yargo, Tugaloo State Park (SP), War Woman, Richard B Russell SP, Swallow Creek, BF Grant, Rum Creek, Oaky Woods, Clybel, Cedar Creek, Ohoopee Dunes North, Hard Labor, Chattahoochee Fall Line-Hillard Tract

### Ticks found at WMAs



Amblyomma maculatum, male and female



Amblyomma americanum – male and female



Dermacentor albipictus – male and female

# Interns are a blessing!

We have been able to get free (to us) interns from a number of sources recently.

- NEHA
- SECVBD
- UGA MPH capstone students
- UWF MPH practicum students
- PHEFA (through the Entomological Society of America)
- APHL Fellowships
- students looking for field experience from other universities

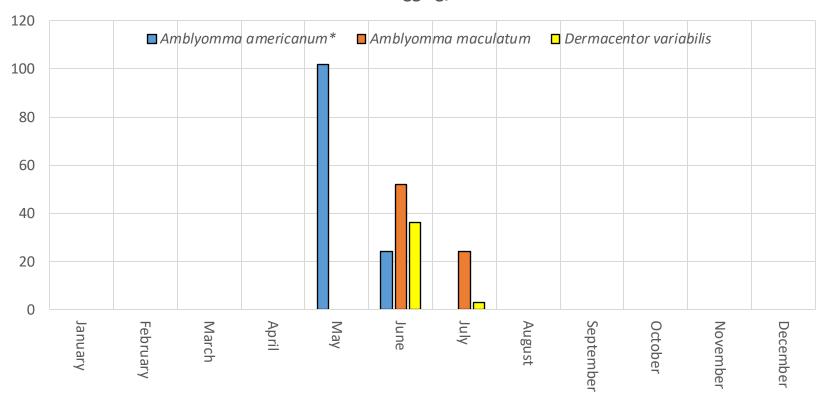
We have the interns work on a variety of projects, including some actual tick dragging.

# Tick Projects

- One practicum student did a short study looking at what hunters know about ticks to determine what education is needed to protect hunters from TBDs.
- I worked with the USDA rabies vaccine drop program to collect ticks off raccoons and hope to continue this winter.
- We are collaborating with the SECVBD on a tick odor attractant study.
- We will be working on filling in the CDC TBD map for Georgia with 3 APHL fellows (<a href="https://www.cdc.gov/ticks/data-research/facts-stats/tickborne-pathogen-surveillance-1.html">https://www.cdc.gov/ticks/data-research/facts-stats/tickborne-pathogen-surveillance-1.html</a>).

# The interns did some tick dragging!

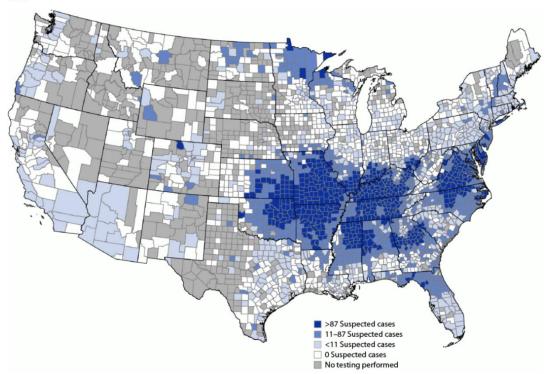




<sup>\*</sup>does not include 3350 A americanum larvae from dragging in July

# Alpha-GAL Education Outreach

FIGURE. Geographic distribution of suspected alpha-gal syndrome cases\* per 1 million population per year — United States, 2017–2022



An intern working with my team just finished a survey on hunters, TBDs, and alpha-GAL. The data are currently being analyzed.

A recently discovered reaction to the bite from the Lone Star tick is that it can cause people to develop an allergy to red meat, including beef and pork.

This specific allergy is related to a carbohydrate called alpha-gal and is best diagnosed with a blood test.

Although reactions to foods typically occur immediately, in the instance of allergic reactions to alpha-gal, symptoms often take several hours to develop.

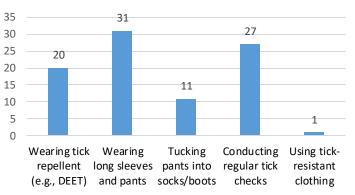
Owing to the significant delay between eating red meat and the appearance of an allergic reaction, it can be a challenge to connect the culprit foods to symptoms.

The Lone Star tick has been implicated in initiating the red meat allergy in the US, and this tick is found predominantly in the Southeast, from Texas to Iowa and into New England. Several other tick species have also recently been implicated.

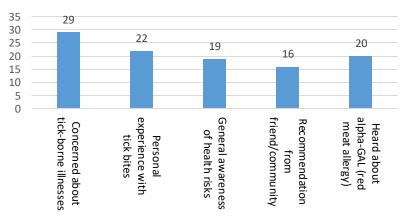
# Tick Project – Hunter Survey Results

Q1: Hunting Experience	Count
Less than 1 year	2
1-5 years	13
6-10 years	6
More than 10 years	11
Total	32
Q2: Aware of Tick Problem	Count
Yes	13
No	19
Total	32
Q3: Knowledge and Precautions	Count
Yes, I know and take precautions	32
Yes, I know but do not take precautions	0
No, I do not know the precautions	0
Total	32
Q4: Precautions Taken	Count
Wearing tick repellent (e.g., DEET)	20
Wearing long sleeves and pants	31
Tucking pants into socks/boots	11
Conducting regular tick checks	27
Using tick-resistant clothing	1
Total	90
Q5: Reasons for Taking Precautions	Count
Concerned about tick-borne illnesses	29
Personal experience with tick bites	22
General awareness of health risks	19
Recommendation from friend/community	16
Heard about alpha-GAL (red meat allergy)	20
Total	106

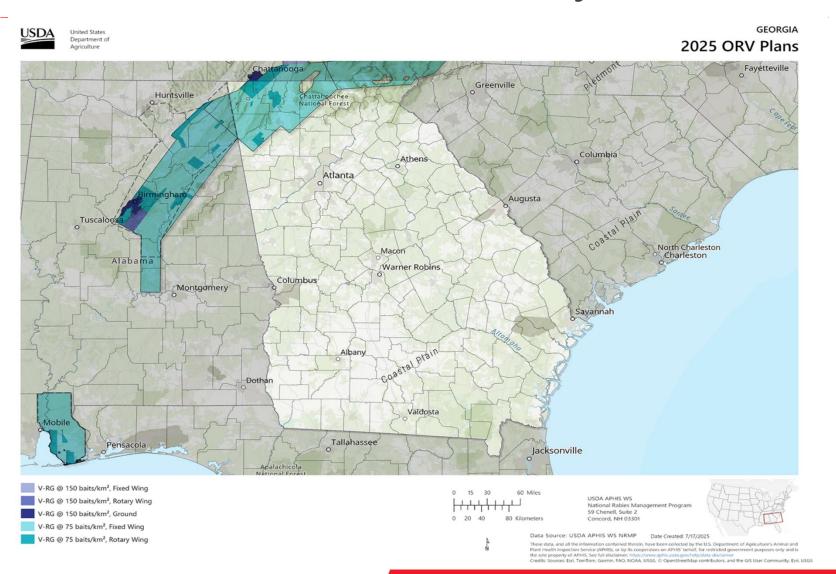
#### **Q4:Precautions Taken Against Ticks**



#### **Q5: Reasons for Taking Tick Precautions**



# Raccoon Rabies Vaccine Bait Project



# Raccoon Rabies Project

- Collaboration with the United States Department of Agriculture (USDA) would allow DPH to collect ticks off raccoons.
- Raccoons are often found around human habitats such as urban and suburban areas that have pet food or trash available for them.
- They also are known to make their homes in attics and crawl spaces.
- With this proximity to humans, it is important to know what ticks are on raccoons specifically.



# Raccoon Rabies Project

Date	species	stage	count
5/13/25	Dermacentor variabilis	males	53
5/13/25	Dermacentor variabilis	females	35
5/13/25	Dermacentor variabilis	nymphs	2
5/13/25	Ixodes texanus (?)	females	3
5/14/25	Dermacentor variabilis	males	101
5/14/25	Dermacentor variabilis	females	54
5/14/25	Dermacentor variabilis	nymphs	2
5/14/25	Ixodes texanus (?)	females	4
5/15/25	Dermacentor variabilis	males	87
5/15/25	Dermacentor variabilis	females	33
5/15/25	Ixodes texanus (?)	females	4
5/15/25	Ixodes scapularis	females	1
5/16/25	Dermacentor variabilis	males	42
5/16/25	Dermacentor variabilis	females	5
5/16/25	lxodes texanus (?)	females	2
5/24/25	Dermacentor variabilis	females	60
5/24/25	Dermacentor variabilis	males	92
5/24/25	lxodes texanus (?)	females	4

#### **Collection Dates:**

May 13-16: Murray, Gilmer and Fannin May 20-23: Walker, Whitfield and Murray



Dermacentor variabilis



Ixodes texanus

### Tick Species Collected in Georgia, 2005-2024 (all data)

Identication	females	males	nymphs	larvae	TOTAL
Ixodes scapularis*	2122	1018	67	2056	5263
Amblyomma americanum^	762	634	772	4175	6343
Amblyomma maculatum	582	688	7		1277
Dermacentor variabilis	456	395	3	198	1052
Dermacentor albipictus	29	41	21	1	92
Rhipicephalus sanguineus	34	30	2		66
lxodes affinis	28	20	1	4	53
Amblyomma spp.			22	7	29
Ixodes brunneus	5		4		9
Amblyomma hebraeum	1	4			5
Ixodes texanus			5		5
Rhipicephalus evertsi evertsi	1	3			4
Argas lahorensis			3		3
Amblyomma tuberculatum			2		2
Rhipicephalus rutilus	2				2
Amblyomma variegatum			1		1
Dermacentor spp.		1			1
Haemaphysalis leporispalustris			1		1
Haemaphysalis parva			1		1
Ixodes cookei	1				1
Ixodes minor	1				1
Rhipicephalus simus		1			1
Rhipicephalus spp.			1		1

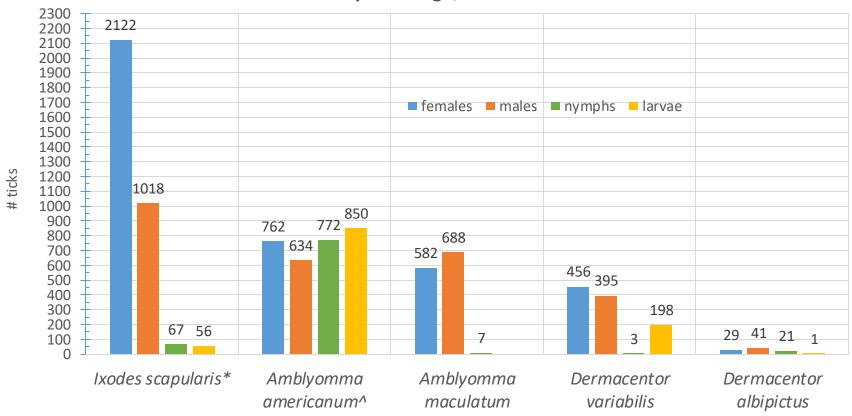
### Most Common Tick Species Collected in Georgia, 2005-2024

Identification	2005	2006	2008	2009	2010	2011	2012	2013	2014	2015
Amblyomma americanum	451	90	184	56	596	278	117	117	37	17
Ixodes scapularis	362	4	50	1	56	204	86	82	13	97
Amblyomma maculatum	22	24	5	3	17	45	42	122	159	110
Dermacentor variabilis	113	23		4	64	248	103	103	62	12

Identification	2016	2017	2018	2019	2020	2021	2022	2023	2024	TOTAL
Amblyomma americanum	18	81	32	271	270	101	48	49	206	3026
Ixodes scapularis	111	75	67	172	508	320	354	258	466	3286
Amblyomma maculatum	149	74	54	90	29	32	85	137	91	1290
Dermacentor variabilis	22	56	58	69	10	50	21	30	54	1102

### Ticks from all Sources

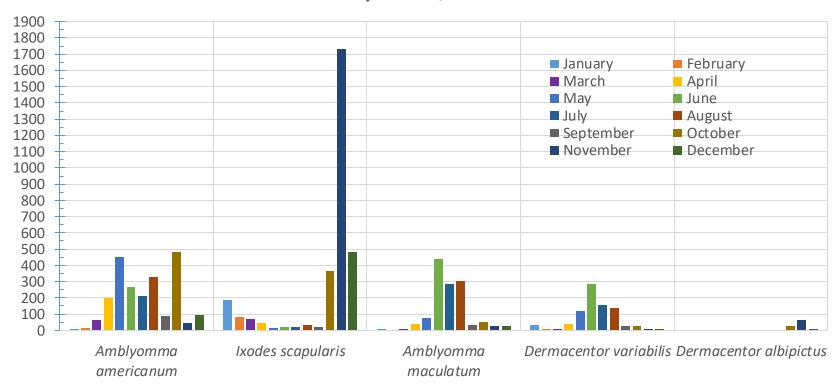




\*does not include 2000 *I scapularis* larvae from one source ^does not include 3350 *A americanum* larvae from dragging

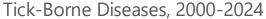
### Ticks from all Sources

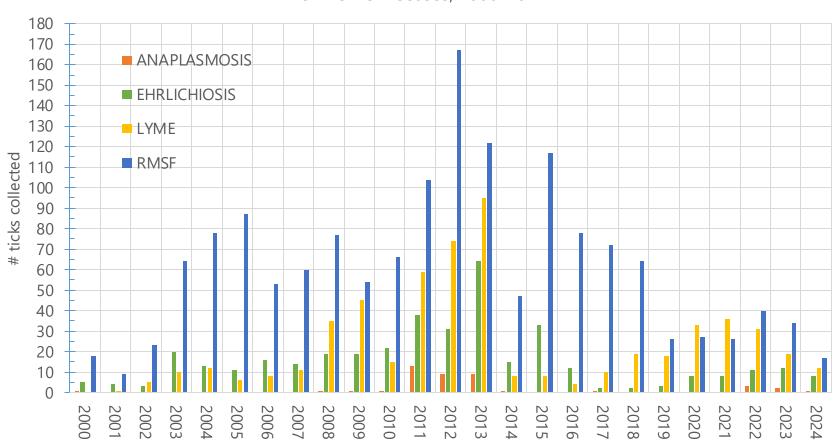
#### Ticks by Month, 2005-2024



<sup>\*</sup>does not include 2000 *I scapularis* larvae collected from one source in January ^does not include 3350 *A americanum* larvae from dragging in July

### Tick-Borne Diseases





### Tick-Borne Disease Outreach

#### AMERICAN DOG TICK (Dermacentor variabilis)



The American dog tick (also called the wood tick) is often found along sidewalks or trails, in grassy fields, and on low shrubs in the woods. Photo: Female American dog tick

#### **HOW TO REMOVE A TICK**









GRASP WITH TWEEZERS

PULL UPWARD

CLEAN/DISINFECT BITE AREA

OF TICK

#### **RECORD SYMPTOMS**

Symptoms generally begin within 30 days of removing an attached tick. Use the table below to record important dates, including the onset of any symptoms you develop. Share this information with your healthcare provider if you become ill.

Tick removal date: \_\_\_\_\_ 30 days from removal: \_\_\_\_

SYMPTOM	DATE	SYMPTOM	DATE
Fever (>100°F or 37.8°C)		Muscle aches or joint pain	
Swelling in the armpit		Nausea/vomiting	
or groin		Lack of appetite	
Ulcers or open sores		Other	
Headache			
Rash			

### WHAT CAN THE AMERICAN DOG TICK TRANSMIT?

While not all ticks carry diseases, the American dog tick can transmit:

- Rocky mountain spotted fever (RSMF)
- Tularemia

Both of these are rare, but watching for symptoms after a tick bite is a good idea.

# We teamed up with Epidemiology to provide tick ID and information on TBDs.

On-Line ID Tool:

https://arcg.is/1XSuSD

Once the tick is identified, the appropriate info sheet is sent to the person who requested the ID.

#### **HOW TO PREVENT TICK BITES**







AVOID TALL GRASS



CHECK YOUR CLOTHING FOR TICKS



EXAMINE YOUR BODY AFTER SPENDING TIME OUTDOORS

### Some of Our Other Duties

### **Education/Outreach/Inservice Training**

- bed bug education
- lice education
- o scabies education
- education on any other arthropod (and other things) the public deems a pest

#### Web Sites

- Insects and Diseases: <a href="https://dph.georgia.gov/environmental-health/insects-and-diseases">https://dph.georgia.gov/environmental-health/insects-and-diseases</a>
- Georgia Mosquito Control Association: <a href="http://www.gamosquito.org">http://www.gamosquito.org</a>

Upload data to the CDC ArboNET database

Mosquito and Tick ID training – discontinued due to funding loss Board members for the GMCA and MAMCA

### Resources

Arbovirus summaries are available monthly during mosquito season – if you want a copy sent to you, please send an email to <a href="mailto:Rosmarie.Kelly@dph.ga.gov">Rosmarie.Kelly@dph.ga.gov</a>

A final arboviral summary has been put together for every year since 2002 and are available upon request

A mosquito surveillance summary has been put together every year since 2017; they are available at <a href="http://www.gamosquito.org/mosquito.htm">http://www.gamosquito.org/mosquito.htm</a> or upon request

Tick surveillance summaries are put together every year and are available upon request

- There are 6 tick surveillance summaries currently available:
  - 2005-2019
  - 2020
  - 2021

- 2022
- 2023
- 2024



# **ANY QUESTIONS???**

http://health.state.ga.us/epi/vbd/mosquito.asp

http://www.GAmosquito.org

thuy-vithi.nguyen@dph.ga.gov

MAMCA's Bruce A. Harrison Outstanding Student Award is presented by the association to recognize the accomplishments and contributions of a student pursuing a degree relating to mosquito control or systematics, vector-borne disease, or related discipline that the Association deems appropriate.

The award recipient must be a resident of one of MAMCA's member states or must be attending a school of higher learning in one of MAMCA's member states. The MAMCA member states include Delaware, **Georgia**, Maryland, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia.

The award recipient will be an invited guest of the Association and will present their research project to the Association at the annual conference. A \$500.00 award will be presented to the recipient at the annual conference. MAMCA will also provide limited compensation for hotel accommodations; costs associated with the annual meeting registration, and ground transportation expenses. The funding for this award is made possible through the generous financial contributions of Azelis and the MAMCA membership. Individuals may nominate themselves and submissions must be postmarked no later than **December 5, 2025**. Submit all applications to: Brian Byrd, PhD Email: <a href="mailto:bdbyrd@wcu.edu">bdbyrd@wcu.edu</a>

#### https://www.mamca.org/awards

The 51<sup>st</sup> MAMCA Conference is scheduled for February 17-19, 2026 in Memphis, TN at the Doubletree Memphis