

FIGHT THE BITE

OFFICIAL NEWSLETTER OF VECTOR MANAGEMENT

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PROGRAM GOALS

The purpose of Vector Management is the surveillance and control of biting arthropods within the Commonwealth that can cause human illness and pestilence. This is accomplished through Integrated Vector Management. Integrated Vector Management incorporates educating the public, arthropod surveillance, and preventative practices coupled with physical, biological, and chemical control applications.

LYCOMING CREEK: A NEW ADDITION TO THE BLACK FLY SUPPRESSION PROGRAM

BY: STEVE MEANS, AQUATIC BIOLOGIST SUPERVISOR

The Little League World Series (LLWS) is an international event that occurs annually in South Williamsport, Pennsylvania drawing on average 300,000 visitors. This event spans a two-week period in mid-August and was held this year from August 14-25. In advance of the event, Black Fly Suppression Program staff increase sampling efforts and treatment of local streams and the West Branch of the Susquehanna River to reduce black fly populations. Part of the sampling effort also includes monitoring peripheral streams that historically have not produced large numbers of black flies.



A view looking upstream from the West 4th Street Bridge with Historic Bowman Field in the background on August 8th when sprays were conducted.



Special thanks to the team of Kristin Brown, Nick Selvage, and Mitch Gochnauer for their on-the-ground assistance in sampling and treating Lycoming Creek.

Samples collected this year from Lycoming Creek, which does not historically produce black flies, had high numbers of *S. jenningsi*, so it was determined that it needed to be treated to reduce the black fly population. Treating Lycoming Creek was prioritized since the minor league baseball park, historic Bowman Field, is adjacent to Lycoming Creek and was the site of the Major League Baseball (MLB) Little League Classic game. The game was scheduled to be played between the Detroit Tigers and NY Yankees on August 18.

Since Lycoming Creek has not historically been treated for black flies, it was not listed in the Vector Management NPDES permit. In order to get the stream included on the permit, Vector Management staff worked with the DEP Clean Water Program to obtain the necessary approvals to protect the upcoming major league game.

Thanks to a quick turnaround and approval, DEP staff were able to lay out treatment sites and mobilize resources to conduct a hand spray of Lycoming Creek on August 8th. This treatment was just in time and ahead of the remnants of Hurricane Debby that caused major flooding to the area the following day. Staff continued to monitor and treat Lycoming Creek for the remainder of the summer and will include Lycoming Creek in routine monitoring during the 2025 season.



Mitch Gochnauer (left) and Kristin Brown (right) performing hand treatments from the bridges along Lycoming Creek.

BLACK FLY NON-TARGET SAMPLING

BY: PAUL MAGES, AQUATIC BIOLOGIST II

PA Black Fly Suppression Program biologists wrapped up their 2024 treatment season on September 19, but returned to the waterways armed with a water meter, kick net, and buckets to collect data and macroinvertebrates for their non-target sampling surveys. Non-target sampling surveys are used to evaluate black fly treatments on aquatic habitat.

Bacillus thuringiensis israelensis (Bti) has been studied worldwide for its impact (or lack thereof) on non-target species with its use in mosquito and black fly control. These studies showed that Bti treatments have no impacts on the aquatic communities. Program biologists are continuing due diligence by implementing a statewide non-target monitoring program to evaluate aquatic macroinvertebrates in Bti treated waterways of the Commonwealth.

Over the past 3 years, biologists have collected 319 samples from multiple sites on 41 streams using the DEP Clean Water Monitoring Protocols, which allows the collected data to also contribute to the network of biological information across the waterways of the commonwealth. In situ measurements of water quality parameters, habitat assessments, and collection of riffle-kick samples are performed at treatment and reference sites in each stream. The macroinvertebrate samples are preserved for future sorting and identification to the genus level. The data is then entered into the Bureau of Water Quality's PEARLS database for future analysis. Biologists are continuing to train and sharpen their identification skills to better understand the macroinvertebrate community of treated waterways.

The yearly monitoring of these waterways will continue to allow detection of any impacts of Bti treatments while gaining insight into the community structure of the black fly habitat. This will help the biologists better understand the black fly ecology and thus improve their ability to troubleshoot treatment issues and/or understand population fluctuations they observe during the busy black fly season.



Caddisfly larva collected as a part of the Black Fly Program's non-target sampling effort.



Left: Ryan Gruver, the north east regional biologist for the DEP Black Fly Program, collects a kick-net sample of macroinvertebrates for enumeration and identification.

***Bacillus thuringiensis israelensis* (Bti)** has been studied worldwide for its impact (or lack thereof) on non-target species with its use in mosquito and black fly control.

HUMAN CASE RESPONSE

BY: BRYAN DIEHL, AQUATIC BIOLOGIST II

The primary goal of Vector Management is to prevent people from getting sick from vector-borne disease. One of the ways we make this happen is to follow up on illness reported by the Pennsylvania Department of Health (PADOH). If PADOH reports an illness to the program, biologists investigate the "Site of the Bite" to survey and control mosquito or tick populations. This work allows the program to reduce the risk of someone else becoming sick in the same area. Ideally, the program uses follow up visits at the "Site of the Bite" to eliminate the potential for outbreaks of vector-borne disease in Pennsylvania.

When responding to a positive WNV human case, I've found it helpful to first familiarize myself with the area by scanning aerial photos and maps for possible trapping sites and mosquito-breeding habitat. After surveying the maps, I inform the municipality and ask if they can provide any additional information about the site. Next, I canvass the area to search for additional habitat, take larval samples, and conduct larval and adult control applications. Surveillance includes a mixture of gravid and host-seeking traps. While on-site, I also knock on doors, speak with nearby residents and businesses, provide educational pamphlets, and leave door hangers. Thorough canvassing can lead to discovering hidden habitats like the abandoned swimming pool the Allegheny County Health Department discovered this past summer.



An abandoned swimming pool that was concealed in a neighboring yard. Discovering these hidden habitats are an important component to a successful mosquito program.

EDUCATION AND OUTREACH

BY: BROOKE CODER, WATER PROGRAM SPECIALIST

Education and outreach are vital components to any vector-borne disease program. The goal of Vector Management is to reduce illness in the Commonwealth transmitted via mosquito or tick. Educating the general public on what they can do to protect themselves is of utmost importance. Simple tips like eliminating standing water on your property or treating water that cannot be dumped with a product like Bti are communicated. Bti is commercially available and is an easy way to help protect yourself and your family. Additionally, wearing repellent and avoiding being outdoors during dusk and dawn are other straightforward ways to reduce your risk of mosquito bites.



DEP Deputy Secretary of Field Operations John Ryder, alongside (from left) Tick-borne Disease Epidemiologist Leah Lind, DCNR Secretary Cindy Adams Dunn, and Secretary of Health Dr. Debra Bogen, deliver a press conference regarding tick and mosquito awareness and safety.

SOUTHERN DEER TICK DISCOVERED IN PA

BY: HOLLY CHAPMAN, AQUATIC BIOLOGIST II

Ixodes keiransi (Southern Deer tick), previously known as *Ixodes affinis*, is a tick native to Central and South America, with the first United States specimens collected in Florida in 1953. This tick has slowly been encroaching northward to states such as North Carolina, Virginia, and over the last 3 years Maryland (2021), Delaware (2022), and New Jersey (2023). During routine summer surveillance, DEP’s Tick Surveillance and Testing Program collected 3 specimens of *Ixodes keiransi*. All 3 specimens were adult males found during the third week of June. Two were found in Chester County and one in Franklin County. These are the first field collected specimens of *Ixodes keiransi* recorded in Pennsylvania.

The Southern Deer tick is morphologically similar to the most common tick found in Pennsylvania, *Ixodes scapularis*, or the Blacklegged tick. The phenology of the Southern Deer tick is unknown here, but it is assumed it differs from their native range because of climate conditions, hosts, and habitat. *Ixodes keiransi* is not known to bite humans, however, it is important in the maintenance of the Lyme disease bacteria in the environment. It shares the common host species, the white footed mouse, which is the carrier of the Lyme disease spirochete. The Tick Program’s routine surveillance will aid in monitoring this tick’s possible expansion throughout the Commonwealth.

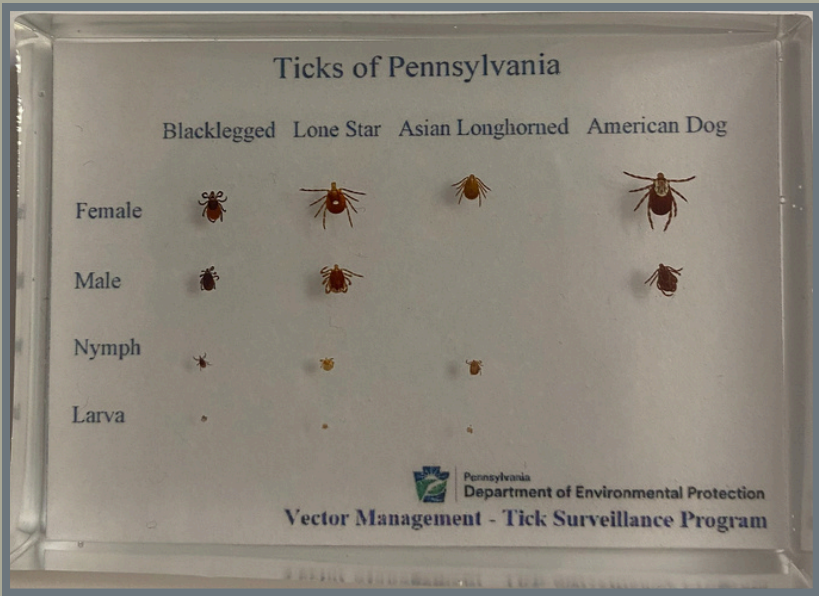


Ixodes keiransi (Southern Deer tick) has been recently collected in Pennsylvania in Chester and Franklin Counties.

TICK CUBES: TOOLS FOR EDUCATION

BY: CHRISTIAN BOYER, AQUATIC BIOLOGST SUPERVISOR

The Tick Surveillance and Testing Program has created resin blocks containing the most commonly collected ticks in Pennsylvania. These resins have been distributed to Department staff as well as county partners to be used at educational events. These resins provide citizens an opportunity to view all life stages of the ticks that they might encounter and open conversations concerning transmission of tickborne pathogens, personal protection, and habitat management strategies to reduce those encounters.



MICROSCOPIC INNOVATIONS LEAD TO BIG IMPROVEMENTS

BY: BEN PAUL, AQUATIC BIOLOGIST II

Vector Management recently purchased a new Nikon stereo microscope. I'm grateful for the opportunity to learn the microscope and software because it's allowed me to play a part in some interesting projects and take some cool and very useful pictures. Our Nikon SMZ-25 bridges the gap between a standard stereo microscope and a compound light microscope as it offers an incredibly high zoom range. This camera equipped microscope gives us the ability to photograph and precisely image and measure specimens far better than we could before. Two of my favorite features include the extended depth of focus (EDoF) and large image stitching options in the software. The EDoF feature allows the operator to take many images at specific depth intervals and automatically combine the images into a single image. This allows the viewer to see a completely focused and comprehensive image of the specimen. The large image stitching feature is used to take several images of a specimen and stitch them together to form one complete image which is useful when dealing with specimens that are too large to fit in the field of view of the microscope.

This microscope gives Vector Management the ability to do many things, including creating a photographic collection of specimens, capture and provide high resolution images for education and outreach, assist with training laboratory staff in species identification, quickly measure specimens without needing to re-calibrate the microscope, and give staff the ability to see smaller specimen characteristics that cannot be easily seen on our standard stereo microscopes. This equipment also greatly improves the ability of Vector Management to quickly share these high-quality images with other experts to collaborate on projects and gain insight into new or rare species identification. For DEP staff that are interested in learning more about this microscope or having a training tutorial, please contact me at benjapaul@pa.gov.



Extended depth of focus (EDoF) image of a *Prosimulium magnum* black fly larva with labral fans and body features in-focus on the same plane.

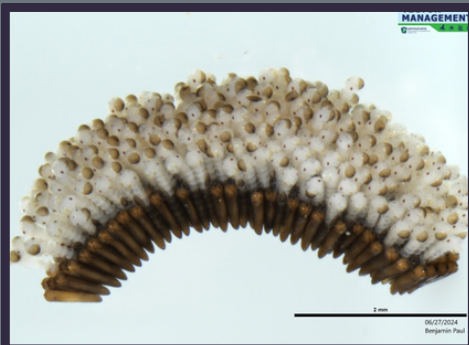


Image of *Culex pipiens* mosquito larvae during a mass emergence event from an egg raft less than a ¼-inch in diameter.

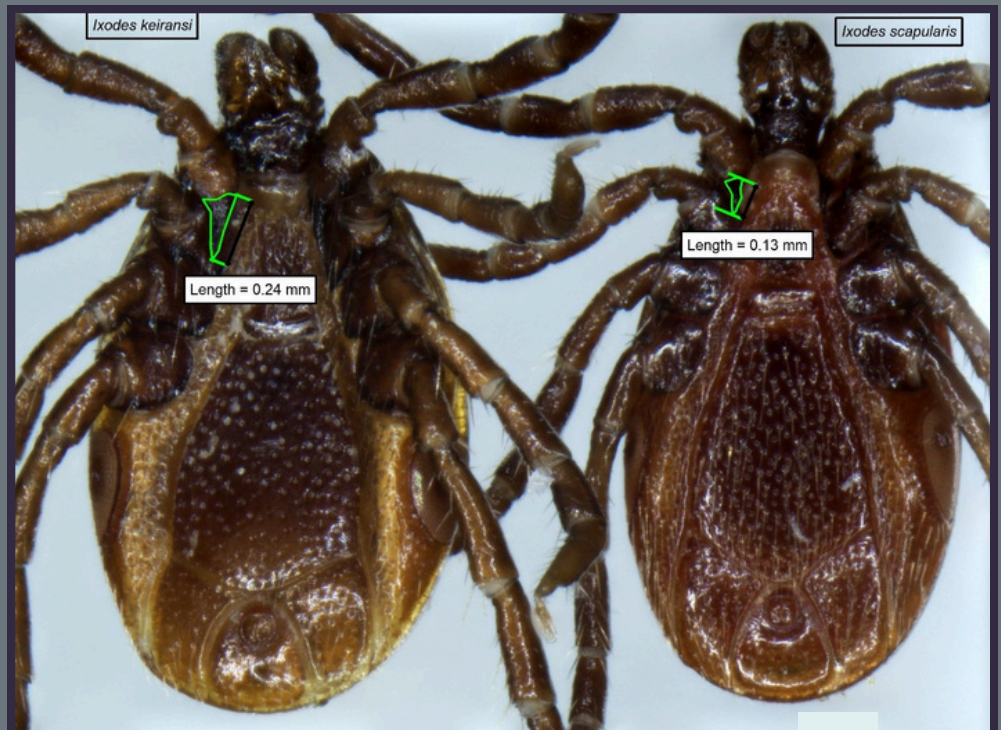


Image comparing the inner coxal spur of the newly named *Ixodes keiransi* (left) and the Blacklegged Tick *Ixodes scapularis* (right) using the measurement tools available in Nikon's NIS Elements software.

BIOLOGICAL SAFETY CABINET SHUTDOWN

BY: ANGIE RAMSEY, MICROBIOLOGIST I

Biological Safety Cabinets are used by laboratory staff to protect personnel and the environment from exposure to infectious agent aerosols. The use of this equipment is essential when testing arthropod samples for diseases. On July 30, the Vector Management Molecular Laboratory's biological safety cabinets (BSC) were shut down due to operational failures. The BSC in the Biosafety Level-3 Laboratory (BSL-3) experienced insufficient exhaust, while the BSC in an adjacent room failed due to excessive exhaust as determined during a recent inspection. A malfunctioning BSC is unsafe as aerosols can be produced during disease testing setup. The laboratory had to halt testing for mosquito and tick-borne diseases for 5 days leading to a substantial backlog of about 1,000 samples. Fortunately, the BSCs were repaired and recertified on August 5, and a recovery plan was put into action.

Microbiologists Bryn Cosklo, Mike Chroscinski, and Angie Ramsey completed five disease testing runs each day following BSC operational certification. Each mosquito and tick-borne disease testing run includes 90 samples plus controls which takes about four hours to complete. This includes the setup, extraction, and purification of ribonucleic acid (RNA) and RNA amplification that enables disease detection. The accelerated and collective efforts by the staff, however, presented a challenge due to limited space, resources, and testing equipment. The lab had to creatively plan each day specifying who used what and when. This achievement is especially noteworthy because it was accomplished without use of overtime.

The Vector Management Molecular Laboratory took on this important challenge, resulting in the quick elimination of the testing backlog and recommencement of swift result entry.



Top: Vector Management's Molecular Laboratory's biological safety cabinet.
Right: Vector Management's biological safety cabinet in the Biosafety Level-3 Laboratory (BSL-3).



Each mosquito and tick-borne disease testing run includes 90 samples plus controls which takes about four hours to complete.

POWASSAN VIRUS IN ALLEGHENY COUNTY

BY: NICK BALDAUF, ALLEGHENY COUNTY HEALTH DEPARTMENT

This summer, I received a human Powassan case in Allegheny County. After receiving permission to collect ticks on site, I met with the property owners and verbally gave them information on ticks and tick-borne disease. I informed them about the size and danger associated with nymphal *Ixodes scapularis* as well as their temporal activity periods. I also talked about the importance of personal protection and prevention (permethrin, tick checks, showering, etc.).

The property is a many-acred woods in Allegheny County. There are mixed hardwoods and conifers on the property, and some of the property contains a larger manicured lawn. I was able to collect 10 nymphal and 112 larval *Ixodes scapularis* from the property from various habitats. All recovered ticks were tested for Deer Tick Virus (Powassan Lineage II), however all were negative.

At the conclusion of my surveillance, I inquired as to whether the family would be amicable to some adult tick surveillance on the property in the fall, and they responded with a resounding "yes". The fall adult surveillance was done in conjunction with DEP staff, and a total of 46 adult Blacklegged ticks were collected in October. I collected an additional 18 adults in November (testing not yet complete). During this collection effort, the family expressed that additional surveillance would be welcome at any time.



Habitat found at the property in Allegheny County where Powassan virus may have been contracted.

HURRICANE DEBBY BROUGHT MAJOR FLOODING TO TIOGA COUNTY

BY: BREANNA AMEIGH, BRADFORD AND TIOGA COUNTIES

On August 9th, 2024, portions of Tioga County experienced extreme amounts of rain from Hurricane Debby. The very sudden and intense rainfall resulted in significant flooding that devastated parts of Knoxville and Westfield. A particular area in Westfield known by locals as the "Tannery Ponds" was filled with many feet of water that remained for weeks following the flood. This 40 acre section of land in the middle of town is a perfect breeding ground for mosquitoes. Our four person crew treated as much of this area with Bti as possible. Suited up with Muck boots, waders, and our Stihl Backpacks, we spent two days attempting to reduce the potential upcoming adult mosquito population.

In the following weeks, we received a handful of mosquito complaints. One complaint, in particular, was from a homeowner in Knoxville who had floodwater remaining in her yard for weeks. Both a BG Sentinel trap and a gravid trap were placed overnight at her property, and over 1,000 mosquitoes were collected in each trap. This resulted in larval and adult controls on this property. On three separate occasions, truck mounted ULV sprays were conducted in both Knoxville and Westfield in an attempt to provide some relief to the residents who were already coping with devastating loss. Our efforts were received very positively by both communities.



Bradford/Tioga County staff Breanna Ameigh along with DEP biologists Maddie Metzger, Kristin Brown, and Dave Hurley treat a floodplain for mosquitoes due to flooding from Hurricane Debby.

UNCLE CHICK

BY: CHARLES CLARK, AQUATIC BIOLOGIST II

Charles "Chick" Clark received his BS in Biology, specializing in environmental biology, from Delaware Valley University in 2000. He earned his degree part time while working full time as a park ranger at Tyler State Park in Bucks County. While at Tyler, and among other duties, Chick maintained a static CO2 mosquito trap for Bucks County Health Department. It seems Chick was destined for the West Nile Virus program. After earning his degree, he was hired by PADEP Southeast Regional Office in 2001. Chick started his career in the Storage Tank Program and was an Inspector for 6 years. He then spent 3 years as a Project Officer in the Hazardous Sites Clean Up program before finding his home in Vector Control in October of 2010.

Chick is currently the longest tenured mosquito biologist in the Southeast Region. He has been able to wrangle the chaos that is the mosquito season in the SE by implementing innovative field operations techniques focusing on resource allocation, strong county partnerships, and teamwork. Chick wears a few hats at PADEP, in addition to his work in Vector Management, he is also a part of the Emergency Response Team. The ER team responds to a multitude of environmental incidents and most notably in the not too distant past, a multi-day train derailment response (pictured here). His favorite part of the job is surveillance and seeing what the catch is as well as being part of a hardworking, hard playing team of professionals.

When not serving the citizens of the Commonwealth, Chick is an avid angler and enjoys time on the water with friends and family. He also enjoys golf, good bourbon, and all things Disney.





WINTER TICK COLLECTION COMPLETE

The Tick Surveillance and Testing Program has completed its adult Blacklegged tick survey for the season. The sampling effort began on October 1st and ends when a minimum of 50 ticks are collected from each county in the Commonwealth. This year's completion marks the earliest since the inception of the Program in 2018. The next earliest completion date was in March of the following year. Weather and tick abundance aided in this effort. Each tick collected will be tested for the causative agents of Lyme Disease, Anaplasmosis, Babesiosis, and Powassan Virus.

UPCOMING EVENTS:

Mid-Atlantic Mosquito Control Association Annual Meeting
February 4 - 6, 2025
Newport News, VA

Entomological Society of America Eastern Branch Meeting
March 15 - 18, 2025
Harrisburg, PA

New Jersey Mosquito Control Association Annual Meeting
March 19 - 21, 2025
Atlantic City, NJ