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FIGHT THE BITE

Official Newsletter of Vector Management

Welcome

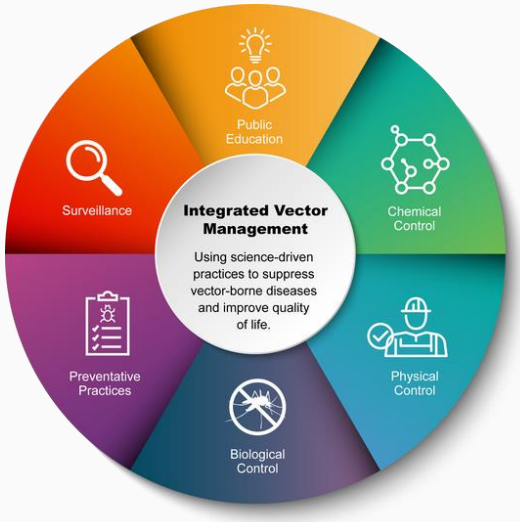
Welcome to the inaugural, biannual Vector Management newsletter. This newsletter is an employee driven publication that offers a place to share success stories, vector discoveries, and science. Thank you for taking the time to read some of what has been happening in Vector Management during the last six months.

-Doug Orr, Vector Program Manager

Program Goals

VECTOR MANAGEMENT

The purpose of Vector Management is the surveillance and control of biting arthropods within the Commonwealth that can make people sick. 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.



This issue:

Mosquito Complaint Leads To Interesting Discovery

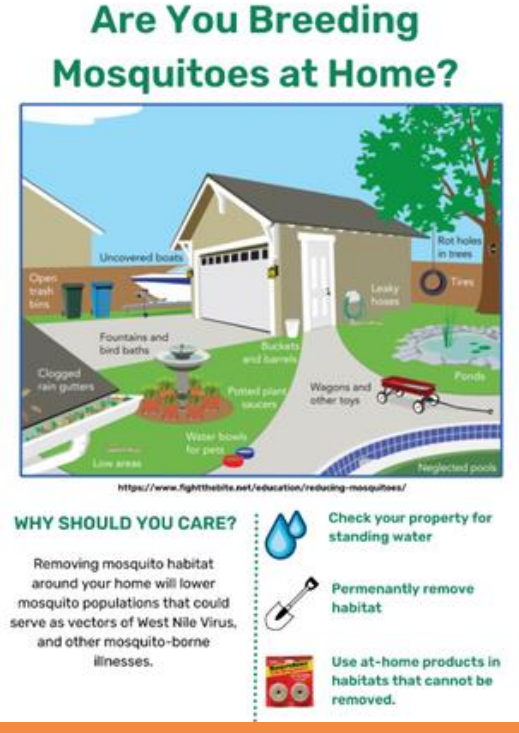
BY MADDIE METZGER, AQUATIC BIOLOGIST II

Berks County Conservation District received a complaint from a resident stating that there were a lot of mosquitoes on their property causing a terrible biting problem. A mosquito trap was set at the residence, and that one trap collected more than 75 mosquitoes! The mosquitoes were identified at the Vector Management Laboratory as *Aedes albopictus*, commonly known as the Asian tiger mosquito. After identifying the mosquito, the primary goal was to locate the water source the Asian tigers are using to support their aquatic portion of their lifecycle.

Berks County home where indicated downspouts were creating mosquito habitat

Mosquitoes are much easier to control in their aquatic habitat because they are confined to the water in their larval and pupal stages; adult mosquitoes disperse over a large area making control more difficult. The Asian tiger mosquito loves to use cryptic water sources such as downspouts, planters, or garden vases for the aquatic portion of their lifecycle. The initial inspection did not discover a "smoking gun" on the owners or neighboring properties at any of the usual haunts this mosquito typically uses. Conversation District mosquito biologists ultimately decided to conduct a backpack spray to reduce adult mosquito numbers until they could return to further investigate the property. Jolie Coates of Berks County Conservation District requested I assist at the location during one of my visits. Again, everything appeared to be dry, but then I noticed that the piping from the gutters disappeared into the ground and we could not visually discern where they came out. Jolie communicated this to the homeowner. The homeowner contacted her municipality and the results shocked us all. Underneath her home was an underground bed or tank that was 30'x52'x3', designed to hold up to 30,000 gallons of water! The municipality spoke with an engineer that recommended flushing the system through a nearby catch basin or flooding the clean outs near their garage. Both options would require connecting to a nearby fire hydrant, but would hopefully flush away the breeding habitat. It is not often that you find the "smoking gun." Unfortunately, they had to live with some mosquito activity this season, but now there is a plan of action to remove the habitat.

"There are a ton of mosquitoes at my home. We can't enjoy being outside."



A Rare Mosquito Identified In Pennsylvania

BY DENNY KEEN, AQUATIC BIOLOGIST SUPERVISOR

Aedes aegypti, also known as the "yellow fever" mosquito, has been identified in the Vector Management Taxonomy Laboratory for the first time since 2018. The adult female specimen was collected 9-14-23 via host-seeking trap in Luzerne County, PA and identified 9-15-23. This is only the third time *Aedes aegypti* has been identified in PA. The two previous detections were in York County (2018) and Bucks County (2002). Luzerne county is the furthest north this species has been detected in the Commonwealth. However, according to the CDC, the range of *Aedes aegypti* potentially extends to all areas of the state. The collection site was located close to a horse racing facility, so it is probable the mosquito was introduced through travel. This species is a very competent vector of many diseases and more surveillance will be conducted next season.

Aedes aegypti specimen taxonomically identified in Vector Management Laboratory.

Franklin County First Graders Get Schooled: Ticks and Mosquitoes

BY SHELBY EBY, AQUATIC BIOLOGIST II

Each year, Chambersburg Area School District holds a field trip for 1st graders at Caledonia State Park where over 500 inquiring young minds get the chance to visit various stations to learn about all things science and outdoors. The Franklin County Planning Department, along with DEP, host the mosquito and tick station. The station begins by selecting a volunteer to stand at the front of the group to have a stuffed toy placed on his head and having his peers guess what the stuffed toy is. Hint: it's either a mosquito or tick! Once the toy is correctly guessed, we quiz the little ones on their basic knowledge of mosquitoes and ticks. We will ask questions like "What do mosquitoes need to live? Where do ticks live? What diseases do mosquitoes and ticks give us? What can we do to protect ourselves from them?"* Sometimes we will get off the wall answers such as "Mosquitoes give us COVID!" or "Ticks wait for you to pass under a tree and then fall on you." Either way, we have found that the kids (and their chaperones) are very eager to hear the correct answers to our questions. Because who wants to ever get bitten, right? The station ends with the kids getting to see live mosquitoes and ticks and answering any lingering questions they may have.

*If you would like the answers to these questions, find them on Vector Mangement's website at https://www.dep.pa.gov/Business/ProgramIntegration/Vector-Management/Pages/default.aspx

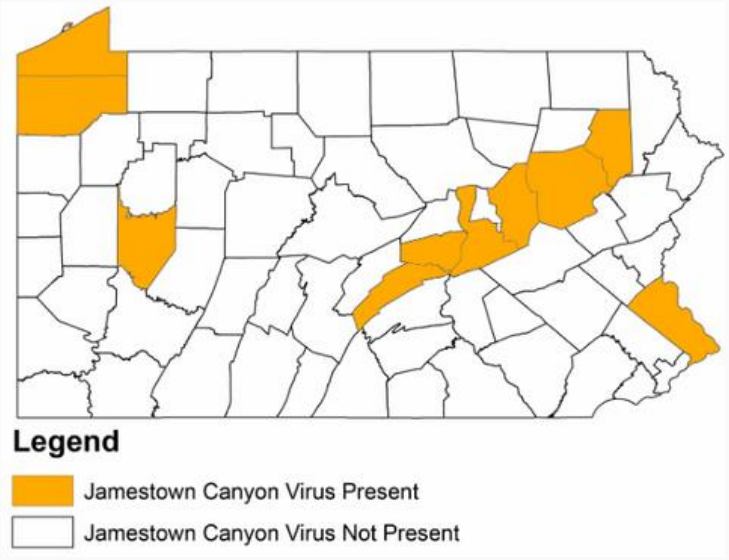
Jason Goetz, Franklin County Mosquito and Tick-borne Disease Specialist, asking a group of first graders if they have ever been bitten by a mosquito or tick.

New Mosquito-Borne Pathogen Detected In Pennsylvania

BY JASON LONG, MICROBIOLOGIST III

Jamestown Canyon Virus (JCV) is an arbovirus transmitted to humans through the bite of mosquitoes, notably those in the genus Aedes. It was first identified from mosquitoes in Jamestown Canyon, Colorado in 1961. While JCV is a neuroinvasive pathogen which rarely causes disease in the United States, the number of cases has been increasing in recent years. According to data from the CDC, there were 3 reported human cases in 2011 and 2 reported human cases in 2012. The number of reported human cases peaked in 2017 with 75 cases, while the numbers fell to 32 cases in 2021 and 12 cases in 2022. While many people infected with JCV do not have any symptoms, rare symptomatic cases do occur. These symptoms include fever, fatigue, and headache. JCV can cause severe disease including encephalitis or meningitis. If severe disease occurs, symptoms include stiff neck, confusion, loss of coordination, difficulty speaking, or seizures. Approximately, half of the reported cases are hospitalized. Diagnosis is based on symptoms, travel history with potential exposure to mosquitoes, and laboratory blood testing or spinal tap. Currently, no specific medicine or vaccine exists for treatment of JCV. Treatment involves rest, fluids, and over-the-counter medicines. In severe cases with hospitalization, intravenous fluids, pain medications, and nursing care may be required.

Jamestown Canyon Virus was detected in mosquitoes in 10 counties.



While most cases of JCV were reported in Minnesota and Wisconsin, some cases have been reported in the Northeast, including 1 human case in Pennsylvania between 2011-2022. Prior to this year, limited statewide surveillance had been conducted by the Commonwealth. This year, Vector Management conducted intensive statewide surveillance. Collections from traps were first sent to the taxonomy lab for identification and pooling of species of interest for JCV. The mosquito pools were sent to the molecular lab for testing by polymerase chain reaction (PCR). PCR uses a specific enzyme to replicate fragments of RNA. The molecular lab tested 2,073 pools for JCV. They found 38 mosquito pools to be positive for JCV by identifying two distinct sets of RNA fragments by a technique from the CDC. One set was used to screen the pools, and the other was used to confirm them for JCV. Jamestown Canyon Virus was discovered in 10 counties.

Deer Tick Virus In Pennsylvania

BY CHRISTIAN BOYER, AQUATIC BIOLOGIST SUPERVISOR

Deer tick virus (DTV) is a tick-borne pathogen that can be transmitted by the Blacklegged (Deer) tick in Pennsylvania. This virus was first detected by DEP staff in Pennsylvania in 2019. Since then, DTV has been detected in ticks in 26 counties across the Commonwealth.

Blacklegged tick (*Ixodes scapularis*). Left to right, larva, nymph, adult male, adult female

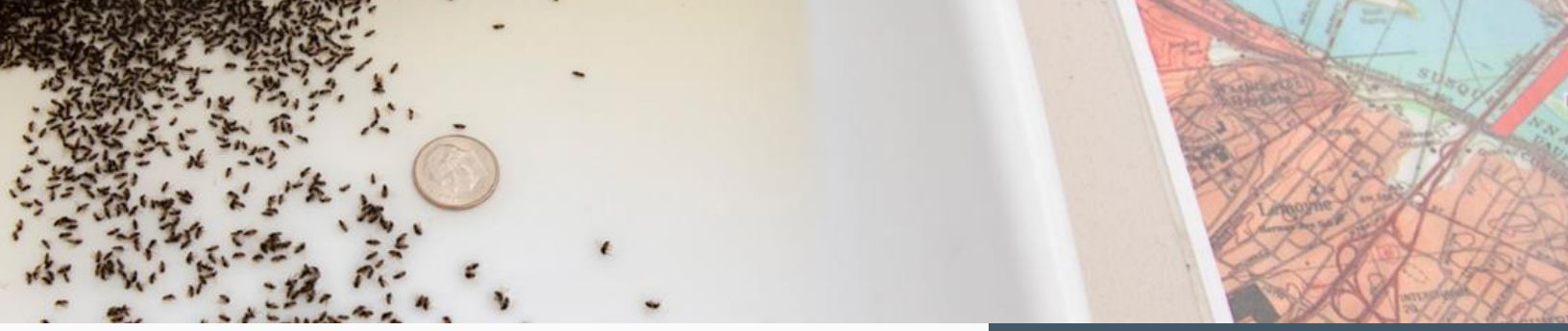
The Tick Surveillance and Testing Program responds to human Powassan virus reports disseminated by the PA DOH. Public use areas in close proximity of the case are sampled for the presence of Blacklegged ticks and then tested for known pathogens including Deer Tick Virus, which causes Powassan Virus infection in people.

This season, staff had the unique opportunity to interact directly with a patient recovering from the disease. Through correspondence with DOH, she was enthusiastic about tick surveillance occurring on her property. Staff visited properties in the vicinity including hers to collect nymphal Blacklegged ticks in August. These ticks were tested and luckily were all negative for Deer Tick Virus. Another visit was coordinated in November to collect adult Blacklegged ticks. These ticks will undergo testing, and the results will be given to the patient.

It was a rewarding experience to interact with her, hear her story, and provide education on how to better protect herself and family, and manage their property to reduce the incidence of tick encounters and therefore tickborne disease transmission.

DTV can cause severe neurological symptoms and can transmit from an attached Blacklegged tick in as little as 15 minutes.

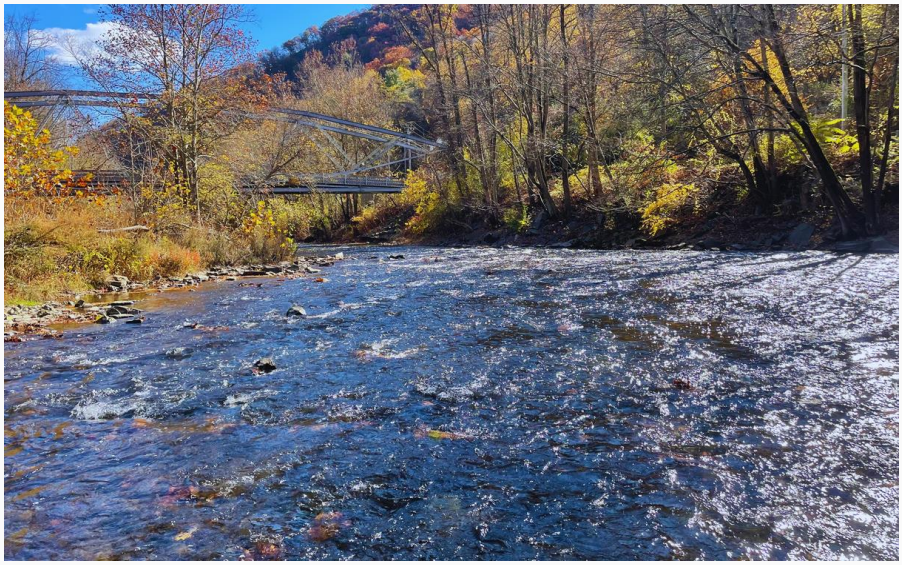
Signage that is displayed at public use areas across the Commonwealth where ticks have tested positive for DTV



Lebanon County Joins Black Fly Program

BY MITCH GOCHNAUER, AQUATIC BIOLOGIST II

The Black Fly Suppression Program is unique in that each county must elect to participate in the program. Interested counties notify the Department in writing, which initiates a survey of all rivers that may support the targeted black fly species (S*imulium jenningsi*).

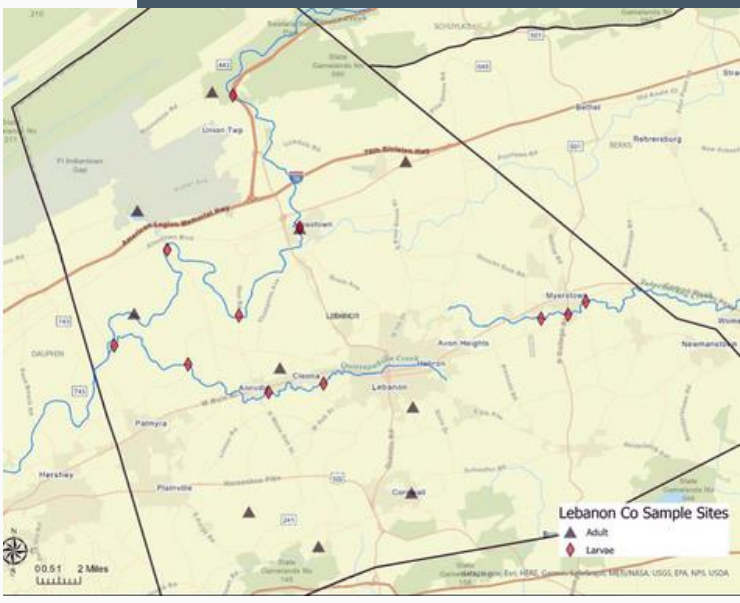


Swatara Creek, Lebanon County

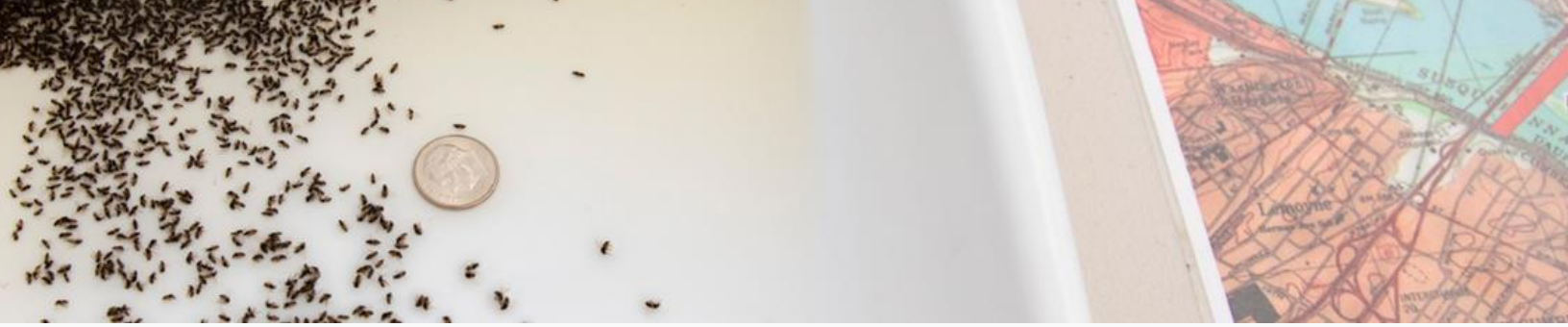
The Lebanon County Commissioners formally notified the Department of their interest in participating in the Black Fly Program in April 2022.

The Lebanon County Commissioners formally notified the Department of their interest in participating in the Black Fly Program in April 2022. Biologists subsequently conducted both larval and adult sampling throughout the county during the black fly season (April–September) to determine which streams supported *S. jenningsi* populations. Swatara Creek, Quittapahilla Creek, and Tulpehocken Creek were targeted for the survey based on their size and stream characteristics, where *S. jenningsi* populations may occur.

Swatara Creek was the only stream in the county where *S. jenningsi* populations were present. This was not surprising since the lower 22 miles were already treated in Dauphin County. The survey identified that the extension of treatments on Swatara Creek for an additional 24 miles upstream into Lebanon County would aid in the suppression of the black fly population. Lebanon County decided to join the program, and spray operations were initiated in 2023. Although it's only been one spray season, this year's extension of spray operations into Lebanon County appeared to reduce the breeding population of black flies in the Swatara Creek watershed. This in turn resulted in a lower number of sprays, reduced costs for program operations in Swatara Creek, and benefited the citizens of both Dauphin and Lebanon.



Sites initially sampled to determine if Lebanon County would be a candidate for the Black Fly Program



Not All Flies That Are Black, Are Black Flies

BY KRISTIN BROWN, AQUATIC BIOLOGIST II

The stable fly, *Stomoxys calcitransis*, is a biting fly that is sometimes mistaken for a black fly by the public. The mistaken identity often occurs in areas where stable fly populations overlap black fly treated waterways. However, stable flies are much larger and resemble houseflies (aka biting houseflies), whereas black flies (gnats) are slightly smaller than a fruit fly. The confusion between the two is not because of their size, but rather because they are both black-biting flies near waterways. Stable flies are much more aggressive than black flies, and they inflict a painful bite when piercing the skin. This is because they do not inject an anesthetic agent like black flies and mosquitoes when feeding. The stable fly evolved by feeding on the lower legs of animals, and it typically targets the ankles or backs of the lower legs in people. Dogs are also bitten by stable flies where they also go by the name “dog flies”. Although insect repellants may be a slight deterrent, most are not effective for very long. Therefore, people start looking for an answer to address this pesky fly. A quick internet search of black-biting flies in Pennsylvania leads people to the DEP Black Fly Suppression website, where citizens file a nuisance complaint for what they think are black flies that are biting them.

Stable fly (right) is often mistaken for a black fly.

PHOTO CREDIT: LYLE J. BUSS, UNIVERSITY OF FLORIDA

Stable flies are a common pest in agricultural barns where there is moist organic material available and livestock to feed upon, thus the name “stable fly”. Management of waste and traps can be effective in reducing stable fly populations in barns. However, in nature, streams and lakes with organic debris along their banks and floodplain is ideal habitat for stable fly reproduction when it becomes saturated during the warm summer months. Once hatched, both males and females seek out a blood meal, and in the absence of livestock or animals nearby, they feed on people or pets. Many of Pennsylvania’s streams and lakes are home to good numbers of stable flies where there is adequate organic debris available and not a farm animal within miles. These waterways are often large warmwater rivers where black flies are also treated during the summer. Unfortunately, there are no means to control stable fly populations along these river floodplains, and they can become a nuisance and interfere with outdoor summer activities. There are many locations in Pennsylvania where stable flies can emerge and often become a problem. However, based on our observations and complaints received through the Black Fly complaint system, most stable fly complaints that overlap black fly treated rivers occur in the Pine Creek Valley of Lycoming County and the West Branch Susquehanna River in Clinton County. Program staff will continue to educate the public when these types of complaints are received but it’s unfortunate that nothing can be done to address this pesky fly in nature.

ANNOUNCEMENTS, EVENTS, AND UPDATES

Winter Tick Collection Underway

TICK PROGRAM

Vector Management's Tick Surveillance and Pathogen Testing Program collects a minimum of 50 Blacklegged tick adults from every county over the winter months. These ticks are in turn identified and tested for pathogens that can make people sick. This data is then shared with the Pennsylvania Department of Health so healthcare providers may stay informed.

Holly Chapman collects Blacklegged ticks from the forest edge.

Black Fly Staff Continue Non-Target Collections

BLACK FLY PROGRAM

Bio-monitoring of aquatic macro-invertebrates is conducted by DEP aquatic biologists on selected streams where black fly control is conducted. The purpose of bio-monitoring is to ensure no environmental impacts are occurring from the use of Bacillus thuringiensis israelensis (Bti). Results have confirmed that a carefully managed Bti treatment program can provide effective black fly control with no impacts to non-target organisms.

Kristin Brown, Mitch Gochnauer, and John Lowin sample benthic macro-invertebrates as a part of the non-target sampling effort.

Upcoming Events:

Mid-Atlantic Mosquito Control Association Annual Meeting

ANNAPOLIS, MD
JANUARY 23-25 2024

North American Black Fly Association Annual Meeting

HARRISBURG, PA
FEBRUARY 7-9 2024

New Jersey Mosquito Control Association Annual Meeting

ATLANTIC CITY, NJ
MARCH 19-22 2024