NEVBD QUARTERLY DIGEST

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NORTHEAST REGIONAL CENTER FOR EXCELLENCE IN VECTOR-BORNE DISEASES

NEREGIONALVECTORCENTER.COM

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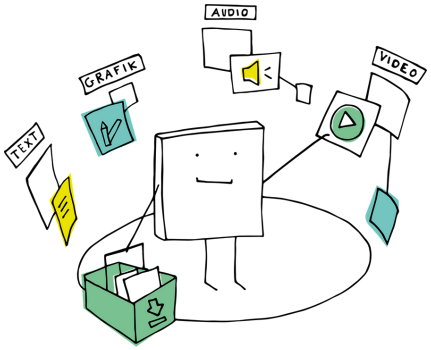
PROGRAMMING UPDATES

NEVBD Connects with Regional Vector Control Associations to Host Virtual Conferences

An unfortunate consequence of public health restrictions instituted in response to the SARS-CoV-2 pandemic is the cancellation of in-person events and conferences across the US. Several vector control associations in the Northeast have adjusted their annual meetings to accommodate these changes, opting to host their events virtually. NEVBD administrative offices have been pleased to partner with vector control associations in our network to support hosting virtual conference events, including the Northeastern Eastern Equine Encephalitis Virus Conference in May and the upcoming Pennsylvania Vector Control Association Annual Meeting in October. We will continue to offer virtual conference support to regional programs seeking assistance. Programs can contact NEVBD Program Manager Emily Mader (emm367@cornell.edu) to explore future partnerships.

Cornell Undergraduates and NEVBD to Develop a Public Outreach and Communication Compendium

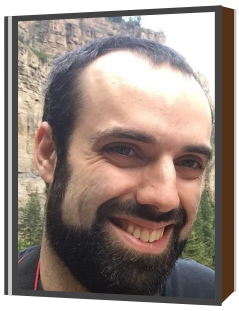
NEVBD is working with public health undergraduate students at Cornell University to develop a vector-borne disease outreach and communication resource compendium for the Northeast region. The project initiated in summer 2020 with a 'census' of open-access communication materials currently available from public health and university extension programs across the NEVBD catchment area. Over the Fall 2020 semester, the student team will conduct a gap analysis on content areas where few materials exist (but are needed), as well as a content analysis to identify the highest-quality resources available on targeted subject matter.



NEVBD's long-term goal for this project is to cross-promote existing resources in the region and work with our regional partners to develop new materials that will augment public outreach on vector-borne disease issues. We encourage partners in the region who would like to learn more about this project to reach out to our offices at nevbd@cornell.edu.

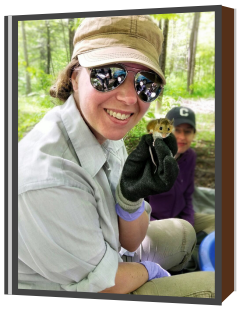
NEVBD Trainees Moving into New Positions this Fall!

NEVBD is proud to announce that three postdoctoral researchers funded by our program are moving to the next stages of their careers! Join us in wishing them a hearty congratulations and best of luck in their new positions!



Dr. James Burtis will be joining the Division of Vector-Borne Diseases of the Centers for Disease Control and Prevention as a Biologist this fall. Dr. Burtis managed the NEVBD Pesticide Resistance Monitoring Network based out of Cornell University, where he worked with collaborators across our network to assess pesticide resistance to commonly-used mosquito control products in the region. Dr. Burtis was also a member of the NEVBD training program workgroup and tick workgroup.

Dr. Maria del Pilar Fernandez will be joining the Paul G. Allen School for Global Animal Health at Washington State University as an Assistant Professor. Dr. Fernandez led several research initiatives in the Diuk-Wasser lab at Columbia University focused on understanding how ticks spread across the environment, how humans come in contact with ticks, and how this affects the risk of tick-borne disease in our communities. Dr. Fernandez also contributed to the Vector Biology Boot Camp program.



Dr. Danielle Tufts will be joining the Infectious Diseases and Microbiology Department at the University of Pittsburg Graduate School of Public Health as an Assistant Professor. Dr. Tufts took a leading role in several applied research projects focused on understanding the invasive Asian longhorned tick (*Haemaphysalis longicornis*) in the Northeast US. Her work has contributed to our understanding of this tick's host preferences and habitat associations.

We also offer congratulations to Erin Hassett and Phurchhoki (Chhoki) Sherpa, who graduated from the NEVBD MS in Entomology program Cornell University in May 2020. Erin currently works with the Delaware Department of Natural Resources as an Environmental Scientist, and Chhoki joined the Kern Mosquito and Vector Control District in California as a Scientific Program Director.

TRAINEE SPOTLIGHT

We are welcoming our incoming class of four MS in Entomology - Vector-Borne Disease Biology students to Cornell University! Our students are starting a two-year program integrating training in vector biology and public health, during which they will complete a 10-week summer research internship with public agency partners in the NEVBD network. Learn more about their backgrounds and interests below!

Antonio Alvarado received his B.A. in Health, Behavior, and Society at the University of Rochester. His undergraduate studies focused on how human behavior and cultural differences influence the transmission of infectious diseases, utilizing an anthropological approach to implement public health interventions. Antonio is interested in understanding how anthropogenic land use changes have contributed to the rise of emerging and re-emerging vector-borne diseases.

Nicole Foley earned a B.S. in Environmental Health at Western Carolina University, which exposed her to the multidisciplinary field of protecting and improving human health. Nicole completed a summer internship with Forsyth County Public Health Department's vector control unit conducting mosquito surveillance and public service requests and also worked with Dr. Brian Byrd in the WCU Vector-Borne and Infectious Disease laboratory. Nicole hopes to apply her skills to help improve and facilitate vector control for rural areas like where she grew up.

Jamie Mangan is from Indiana and earned her B.S. in Human Biology from Indiana University (IU). While at IU, she participated in One Health research of tourism and zoonoses in South Africa. After graduating from IU, she worked as the vector control and GIS coordinator at the Lake County Indiana Health Department. She in interested in a One Health approach to understanding disease vectors and transmission.

Joseph Poggi graduated with a B.S. in Wildlife and Conservation Biology from the University of New Hampshire. Since graduating, he has worked in the northeast on a variety of research projects such as moose/winter ticks (*D. albipictis*), rodents/black-legged ticks (*I. scapularis*) and little brown bats/white nose syndrome (*G. destructans*). As a technician in the Harrington lab at Cornell University, Joe worked on various projects testing mosquito and tick pesticide resistance as well as tick bite prevention outreach. He is interested in evaluating ecology and control of vector-borne diseases.

Updates on the Future of the NEVBD Master of Science in Entomology - Vector-Borne Disease Biology Program at Cornell University

NEVBD has supported an innovative **MS in Entomology – Vector-Borne Disease Biology** program through Cornell University as part of our training platform. Through our funding from the Centers for Disease Control and Prevention (CDC), we have been able to support this program at no-cost to three cohorts of students. However, we have updates to program administration that have implications on the cost of attendance for future students.

Moving forward, as our funding support with the CDC ends, we will not be able to offer financial support to future program applicants and graduates. Individuals who apply to the program should be prepared to cover the full cost of attendance. NEVBD is continuously seeking additional sources of funding to support interested students. Should additional funding become available, we will dedicate financial support to MS students enrolled in this degree program. **Outside of a renewal of funding, however, we want to emphasize that NEVBD is not able to provide financial assistance to future classes of MS degree students.**

For those interested in applying to the MS Vector-Borne Disease Biology program, please submit your application to the Cornell Graduate School by the deadline (December 1), citing the program and Dr. Laura Harrington in your application materials. Interested applicants are encouraged to contact Dr. Harrington or Emily Mader with questions.

- Laura C. Harrington, PhD (lch27@cornell.edu)
- Emily M. Mader, MPH MPP (emm367@cornell.edu)

RESEARCH HIGHLIGHTS

NEVBD colleagues at Rutgers University Center for Vector Biology have been working hard to understand the biology, behavior, and control of the invasive Asian longhorned tick (*Haemaphysalis longicornis*).

Multiple Pruritic Tick Bites by Asian Longhorned Tick Larvae (*Haemaphysalis longicornis*)

Study Summary: Dr. Alvaro Toledo and doctoral student Matthew Bickerton published a brief report in June 2020 documenting a tick biting case by *Haemphysalis longicornis* larvae on a person. This is the first report of bites on a human by the larval life stage of this tick species in the United States. In this case report, a human working on a public park removed eight attached larvae from the upper torso. Small, erythematous pruritic lesions - reddened itchy spots - developed at the bite sites. These resolved within two weeks and were the only symptoms associated with the tick bites. You can read the full brief report in the *International Journal of Acarology*.

Implications: The Asian longhorned tick is not an anthropophilic tick species (anthropophilic ticks bite humans frequently). Nevertheless, this tick species can reach high numbers and occasionally can bite humans. Thus, it is important to to determine what pathogens can be carried and transmitted by this tick species in the US to assess the risk that this tick presents to humans.

Photo by Matthew Bickerton. Dorsal picture of *Haemaphysalis longicornis* larva removed from a human subject

A Life Stage Targeted Application Approach for the Control of *Haemaphysalis longicornis*

Study Summary: Dr. Alvaro Toledo and doctoral student Matthew Bickerton examined the effects of targeting the peak activity for three life stages of the Asian longhorned tick using lambda cyhalothrin during 2019. Targeting adult ticks in August achieved control for both adults and larvae for the remainder of the season. This may also lead to a decrease in the number of nymphs that appear in the following year (the team is currently evaluating this for 2020). A summary of the results of this control trial was recently accepted for publication in *Ticks and Tickborne Diseases*, so stay tuned to read the full article of results this fall/winter!

Implications: Timing control treatments to target specific life stages can increase the effectiveness of the chemical application and can be used as a control tool.

VECTOR VILLAIN BIOSKETCH

The Woodchuck Tick (a.k.a. Groudhog Tick) (*Ixodes cookei*)

Photo by US National Tick Collection, Georgia Southern University

The woodchuck tick, also known as the groundhog tick, is a common hard tick in the northeastern United States and southeastern Canada. This tick looks very similar to the blacklegged tick (*Ixodes scapularis*), and must be identified by examining the mouthparts using a microscope.[1]

This tick is important to human and animal health because it can carry and transmit Powassan virus, which can cause Powassan encephalitis in humans. Fortunately, it has not been associated with transmission of the bacterium that causes Lyme disease (*Borrelia burgdorferi*).[2]

Animal Hosts and Feeding Habits

Woodchuck ticks commonly feed on their namesake - woodchucks. They can also be found on other small mammals including raccoons, mink, skunks, domestic dogs and cats, and foxes.[3, 4] Woodchuck ticks rarely bite humans.[5] It typically takes about seven days for a woodchuck tick to take a full blood meal.[6]

Geographic Range and Habitat

Woodchuck ticks can be found anywhere east of the Rocky Mountains and are common in the Northeast, Upper Midwest, Great Lakes region, and southeastern Canada. You typically find woodchuck ticks in the dens or nests of their animal hosts.[7]

Life Stages

The woodchuck tick has three blood feeding life stages: larva, nymph and adult. These ticks are most abundant in the summer months, particularly July. Woodchuck ticks can complete their full life cycle in one year if hosts are available and the environment is suitable. However, these ticks are hardy and can survive a long time – up to a year – without a blood meal.[7] Female woodchuck ticks can lay between 400 and 700 eggs after they complete their final blood meal.[6]

[1] UMaine Cooperative Extension. *Woodchuck Tick - Ixodes cookei*. IPM Fact Sheets. Accessed August 2020. Available at: https://extension.umaine.edu/home-and-garden-ipm/fact-sheets/common-name-listing/woodchuck-tick-ixodes-cookei/
[2] Barker et al. 1993. The groundhog tick *Ixodes cookei* (Acari: Ixodidae): a poor potential vector of Lyme borreliosis. *J Wildl Dis*. 29(3):416-22. doi: 10.7589/0090-3558-29.3.416
[3] Kollars and Oliver. 2003. Host associations and seasonal occurrence of *Haemaphysalis leporispalustris*, *Ixodes brunneus*, *I. cookei*, *I. dentatus*, and *I. texanus* (Acari: Ixodidae) in Southeastern Missouri. *J Med Entomo*l. 40(1):103-7. doi: 10.1603/0022-2585-40.1.103
[4] Lee et a. 2019. Passive animal surveillance to identify ticks in Wisconsin, 2011-2017. *Insects*. 10(9):289. doi: 10.3390/insects10090289
[5] Centers for Disease Control and Prevention. Powassan Virus. Accessed August 2020. Available at: https://www.cdc.gov/powassan/index.html
[6] Ko. 1972. Biology of *Ixodes cookei* Packard (Ixodidae) of groundhogs (*Marmota monax* Erxleben). *Can J Zool*. 50(4):433-6. doi: 10.1139/z72-061
[7] UMaine Cooperative Extension. *Woochuck Tick*. Tick Species of Maine. Accessed August 2020. Available at: https://extension.umaine.edu/ticks/maine-ticks/woodchuck-tick/