Research notes: On the hunt for Lyme disease

March 20, 2015

With socks shoved into their pants, hair pulled back and rubber bands pinning down their shirt sleeves, Professor Tracy Curtis' students brave the dreaded wilds of tick country.

Of course, tick country surrounds us, although its denizens may be hard to spot with the eye; adult deer ticks can be the size of a sesame seed and nymphs a mere dark spot the size of this sentence's period. But with the rise of Lyme disease in Broome County, this tiny world is becoming increasingly important – and the subject of cutting-edge research at SUNY Broome.

Two years ago, Binghamton University Professor Ralph Garruto contacted Curtis about the possibility of a collective research effort involving the prevalence of Lyme disease among local ticks. Curtis was excited about the opportunity and got her students on board.

Students in BIO 170, Research Experiences in Biology, went out into the field to collect ticks – an effort that brings with it serious risks. Lyme is the fastest spreading infectious disease in New York State; nationwide, an estimated 300,000 new cases of the disease were diagnosed last year alone.

"They have to follow a strict protocol; they're taking all the precautions," said Curtis, adding that no student on the field team has come down with Lyme. "They actually have to sign a contract."

Each tick's gender, species, location and other data are logged by students.

Using white canvas sheets, students collected ticks on the trails of Chenango Valley State Park, as well as the nature trail behind campus. They also logged an extensive amount of data on each tick, listing their gender, species, the area they came from, the trail they were on and even what side of the trail. Over the past two years, students have collected roughly 800 ticks, now residing in a freezer in the Natural Science Center.

"We had one student we called the tick whisperer. He could capture ticks like no one else could," Curtis said with a smile.

The project is now moving into its second phase: extracting DNA from the ticks to see if they carry the Lyme disease spirochete*, Borellia burgderferi*. The procedure involves pulverizing the ticks with metal beads, using chemicals to remove the DNA, finding and amplifying the DNA sequence you're looking for and then tacking chemicals to the DNA that will show up in ultraviolet light. Right now, the class is working on the last step.

Students agree to a strict set of protocols to protect them from Lyme disease.

Students collected ticks from Chenango Valley State Park and on the nature trail behind campus.

Binghamton University estimates that about a third of all ticks have the disease, and the research will help verify whether that's the case. But while the project has moved on to DNA extraction, that doesn't mean that students won't be out in the fields this spring in their protective gear. In fact, Curtis said the program recently received a permit from the state Department of Environmental Conservation to expand their tick research area outside of Chenango Valley State Park.

"As soon as the snow is gone, we'll have a look at Otsiningo Park and the Vestal Rail Trail – where people like to go walking," she said.

Students will also discover how this year's harsh winter has affected tick populations. If patterns hold, tick numbers should be down. Two years ago, students gathered 500 ticks – including 100 on a single day, found not only on the collector sheet but students' clothes. After last year's chilly winter, students gathered only 300, Curtis noted.

There is a new push for research at community colleges, including backing from the National Science Foundation, according to Curtis. Research opportunities also prove beneficial to students on a number of levels, from increasing their understanding of science to improving their prospects when transferring to a four-year school.

"They love it," Curtis said of her students' attitude toward research. "A lot of students have one semester and then want to do it for another semester."

Adult deer ticks are only the size of a sesame seed.

Students gathered about 100 deer ticks in one day along a trail in Chenango Valley State Park.

Filed Under: Focus on Accomplishments, FOCUS on Wellness