



# Ticks: More than a blood-sucking nuisance



Gross. That's one of the first words that comes to mind for many people when they hear the word **tick**.

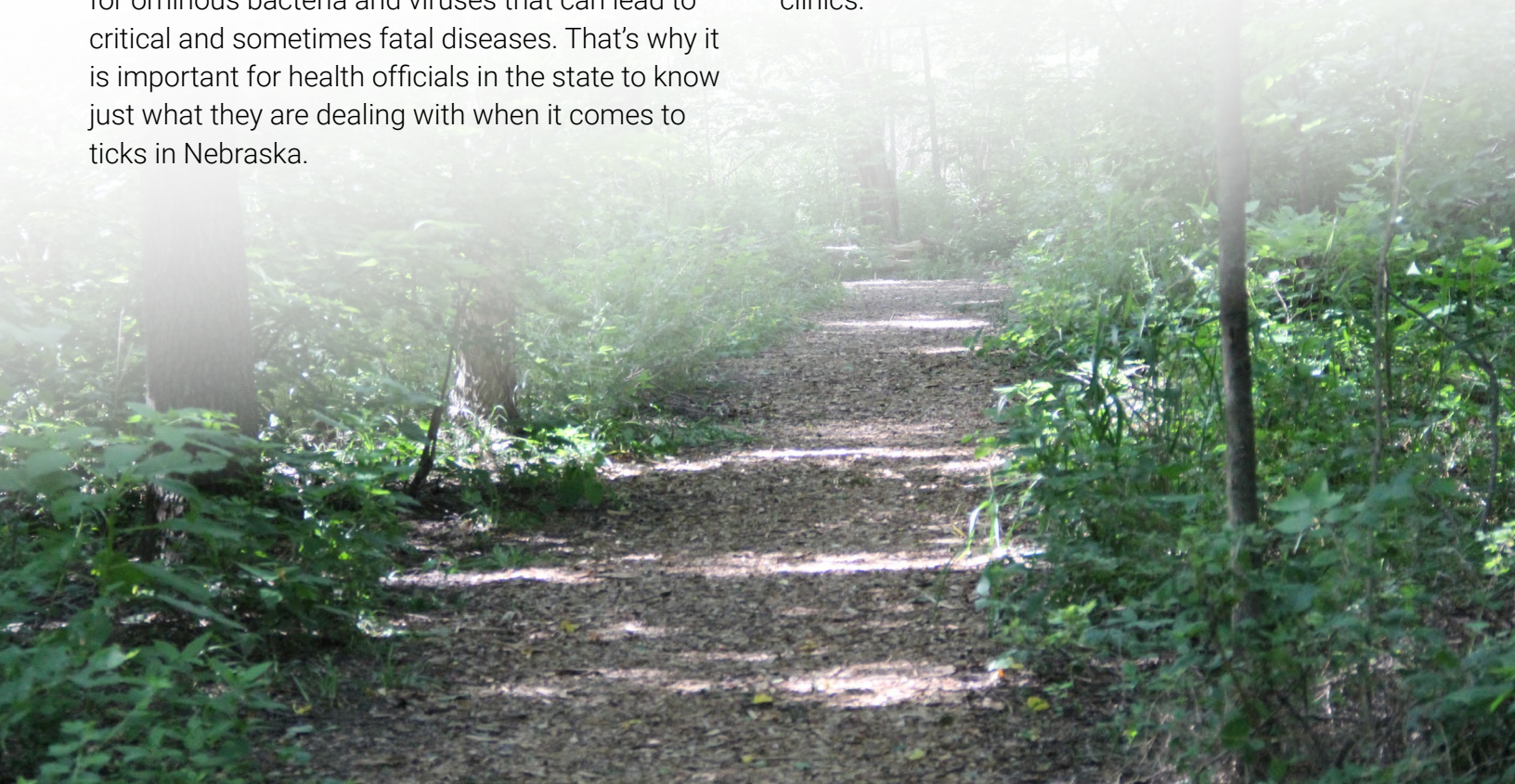
That's because the little creepy-crawly mites use people and animals as hosts to satisfy their need for blood for egg development and to transition between life stages. Once ticks are engorged with the life-needed plasma, they become ugly, bloated, oversized blobs. Not a pretty picture.

It would take an enormous invasion of ticks on one animal (human or otherwise) to actually be able to zap away enough blood to be a danger.

The real threat from ticks is they tend to be **vectors** for ominous bacteria and viruses that can lead to critical and sometimes fatal diseases. That's why it is important for health officials in the state to know just what they are dealing with when it comes to ticks in Nebraska.

Two **Nebraska Department of Agriculture** (NDA) staffers, who think ticks are more interesting than gross, have begun work on a federally grant-funded surveillance project designed to determine the prevalence, distribution and types of species that are present in the state.

"Right now Nebraska has a limited knowledge on tick distribution and tick-borne disease prevalence rates in the state," said David Nielsen, an entomologist and survey coordinator for NDA. "This project allows us to conduct surveys for various life-stages of ticks out in the field. We will also be working with veterinarians across the state to collect ticks from animals that come into their clinics."



That's where Dr. Bill Meier comes in. As the State Veterinary Epidemiologist in NDA's Animal and Plant Health Protection Focus Area, Meier will focus on ticks that pose a threat to one of the state's top economic drivers, the livestock industry.

"I got involved in this project because it is important for Nebraskans to understand the distribution of different tick species across the state," said Meier. "We have the potential for new species of ticks to come into Nebraska, and it is important to understand where they are located and what possible diseases they could inflict on cattle and other livestock in the state."

## Partnering Up

While it is vitally important to NDA to protect animal and plant

health as it relates to agriculture in the state, the agency is also working with partners to safeguard human health as well.

"My wife is a clinical microbiologist at UNMC ([University of Nebraska Medical Center](#)) which expressed concern about having higher numbers of Lyme-like diseases reported in Nebraska," said Nielsen. "As our department conducts tick surveys, we were asked to look for deer ticks since they are the vector for the [pathogen](#) that causes [Lyme disease](#)."

After discovering deer ticks in Douglas, Saunders and Sarpy counties, Nielsen realized the value of also working with the [Nebraska Department of Health and Human Services](#) (DHHS) to share information and coordinate efforts.

"We're hoping DHHS will also receive federal funding for tick surveillance so we will be better able to coordinate our efforts," said Nielsen. "There is a continuing effort for agencies and organizations to work together in protecting the health of Nebraskans as a whole."

## Collecting Ticks Two Ways

There are two different types of surveillance being used in the tick collection process.

Environmental surveillance involves going to where the ticks live, typically public places such as parks that have lots of grassy and wooded areas.

The tools for collection are somewhat simplistic: pieces of cloth attached to plastic tubing to form drags, flags and sweeps. The drag is used in transitional



Nielsen (left) and Meier examine a tick that latched onto a cloth drag.

## Quick Tips for Tick Prevention and Detection

- Use a chemical repellent that contains at least 20 percent DEET.
- Wear light-colored protective clothing preferably covering legs and arms.
- Tuck pant legs into socks.
- After coming in from the outdoors, consider throwing your clothing in the dryer at high heat for five minutes to kill any free-riding ticks.
- Avoid tick-infested areas.
- Check yourself, your children, and your pets daily for ticks and carefully remove any ticks that you find.
- Areas on the body that are most susceptible to ticks are underarms, in and around ears, backs of knees, groin area, and in and around head and hair.

areas, where vegetation shifts from grass to woods. Flags are used in heavier vegetation such as shrubs, bushes and tall grass. Sweeps work best to collect immature stages of ticks (larva and nymphs) that are found in leaf litter and dense wooded areas.

“The ticks will attach themselves to the cloth as it goes by so we have to inspect it fairly regularly,” said Nielsen. “It’s also important we check our shoes and pant legs after we sweep an area because the ticks like to latch onto us too.”

In addition, Nielsen also sets overnight traps at some of the surveillance sites. The traps use dry ice (a solid form of CO<sub>2</sub>) in order to draw in ticks.

“When humans and animals exhale, they emit CO<sub>2</sub>,” he said. “The ticks go toward the CO<sub>2</sub> because it helps them find hosts.”

The other type of surveillance being conducted for the project is animal surveillance. This involves assistance from a variety of sources.

“We want to take advantage of what we already have as ‘boots on the ground,’” said Meier. “For instance, the department has field veterinarians across the state who are assisting us in collecting ticks both from private animal clinics as well as from animals they deal with themselves.”



Nielsen pulls a cloth drag in a grassy area of a public park.

Once collected, the ticks are typically kept refrigerated to maintain their integrity until they can be delivered to the **Nebraska Public Health Laboratory** for evaluation. Lab technicians will confirm tick species and what, if any, type of pathogens they are carrying.

## Ticks and Diseases

The most common tick species in Nebraska are the **American dog tick** (aka wood tick) and **lone star tick**. **Deer ticks** (aka black-legged tick) were recently discovered to be established in the east central part of the state. All three tick species carry diseases that pose a real health threat to people and animals.

Two diseases that have probably generated the most concern are Lyme disease, vectored by the deer tick, and **Rocky Mountain spotted fever** (RMSF), vectored

Nielsen holds a tick sample from a recent survey collection.





American dog tick



Lone star tick



Deer tick laying eggs

by the American dog tick. Left untreated, Lyme disease can be debilitating, and RMSF can be fatal. Other serious diseases that can be caused by ticks include **babesiosis, anaplasmosis** and **tularemia**.

“We don’t know for sure just how many other tick species or potential diseases could be in our state; that’s why this project is so

important,” said Meier. “Nebraska is a beef state, and we have lots of cattle moving in and out of the state every day. That means new ticks species could be traveling with them, and that also holds the potential for new diseases.”

In 2018, a tick species new to Nebraska, the **Gulf Coast tick**, was discovered at two locations in Lancaster County.

The distribution and prevalence of this new tick is still to be determined, but as with any new species, its potential to carry diseases to livestock, pets and people, is a concern.

“Some people view the Nebraska Department of Agriculture as only a regulatory agency,” said Meier. “But the scope of our work encompasses the protection of animal and plant health in the state, and I think this project fits right in with that mission.”

## The “One Health” Approach

An initiative being promoted by the United State Department of Agriculture (USDA) and other governmental agencies, **One Health**, is the collaborative effort of the human, veterinary and environmental health communities.

“We feel Nebraska Department of Agriculture’s (NDA) tick vector study aligns with the ‘One Health’ concept because of the collaboration of efforts and focus on harmful

pathogens,” Administrator of NDA’s Animal and Plant Health Focus Area Tammy Zimmerman said. “Ticks present a threat to humans, animals and the environment, the emphasis laid out in the One Health initiative.”

NDA plans to share data and collaborate with the Nebraska Department of Health and Human Services and the University of Nebraska Medical Center in regards to tick surveillance taking place across the state.

Nielsen added that the ability to partner with other state agencies and organizations provides the opportunity to share information and extend that health protection to Nebraska citizens.

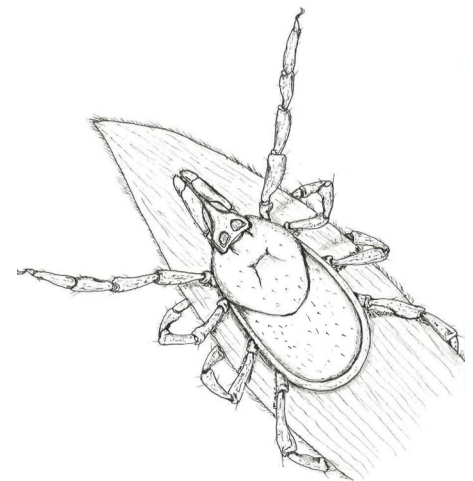


Illustration by David Nielsen