Scientists to breed ticks to study how to slow spread of diseases

June 15 2015, by Mará Rose Williams, The Kansas City Star

To most people, ticks are loathsome, disease-riddled little bloodsuckers. Best avoided.

To Roman Ganta, they're a scientific subject worthy of a life's work.

He's setting up a breeding facility in Manhattan, Kan., just for ticks. Soon he'll be rearing thousands of the tiny arachnids, trying to learn more about how they harbor and spread sickness to humans and animals.

Ticks are responsible for the spread of more than a dozen diseases in people, including some that can be fatal.

"We have no vaccines for most of the pathogens," said Ganta, a professor at Kansas State University and director of its Center of Excellence for Vector-Borne Diseases.

Ganta, 56, knows firsthand how ill a person can become when infected with a vector-borne disease. At age 25, living in a small village in the southern part of India, he was stricken with malaria, a mosquito-borne disease common in Asia and Africa. Malaria kills 1.2 million people a year. Ganta was ill for 6 months with the disease, which had killed a close friend.

When Ganta recovered, he promised himself to use his education to work toward slowing the spread of vector-borne diseases to humans and animals.

"It's my passion," he said.

He eventually moved to the U.S. and worked at the University of Florida from 1991 to 1994 on malaria and began his first research on Rickettsial diseases. Rickettsia is an infectious bacteria spread by ticks, chiggers, fleas and lice. He brought his tick research with him to K-State in 1998.

"Roman Ganta is a world-renowned leader in Rickettsial research for vector-borne illness," said Kelly Lechtenberg, whose company in Oakland, Neb. - Midwest Veterinary Services and Central States Research Centre - does research and development for pharmaceuticals.

"Vector" refers to blood-sucking arthropods - insects and arachnids - that pass along disease while feeding.

Lechtenberg, who holds a doctorate from K-State's College of Veterinary Medicine, recently gave the university space at his Veterinary and Biomedical Research Center in Manhattan for the tick-rearing lab.

"The more we learn about the environment of ticks, the more broad-reaching intervention we can put in place," Lechtenberg said. "We don't care if all the ticks carry Rickettsial diseases as long as none of them get on us and make us sick."

In many parts of the world, mosquitoes pose a greater threat to people than ticks. But in the United States, sickness from mosquitoes is rare because of the development of commonly used protections, Ganta said.

"Ticks have emerged over mosquitoes as the number one problem for vector-borne diseases in the U.S.," he said. "And the problem continues to grow. They are really prevalent. One tick can have four to five different pathogens. The probability of a person getting sick from a single tick bite is high."

Common tick-borne diseases in the Midwest include Ehrlichiosis, Rocky Mountain spotted fever and Lyme disease. According to the Centers for Disease Control and Prevention, more than 35,000 confirmed or suspected cases of Lyme disease were reported in 2013, dwarfing Rocky Mountain spotted fever (2,000 cases in 2010) and Ehrlichiosis (740 cases).

In June 2014, a newly discovered tick-borne disease - Bourbon virus - killed a man who lived in Bourbon County, Kan. Recently another case was reported in Stilwell, Okla.. That patient survived.

Another recently discovered tick-carried disease, Heartland virus, has made eight people sick in Tennessee and Missouri over the last three years.

We're in peak tick season - spring through summer. However, the CDC says adult ticks can be searching for a host any time temperatures are above freezing.

Ticks go through three stages in life: six-legged larva, eight-legged nymph and adult. At each stage, the tick requires a blood meal before it can develop. They can feed for days on anything from reptiles to humans and go from host to host to host.

"That presents a high probability of transmitting pathogens from one host to another," Ganta said. "Why those pathogens survive from host to host, we don't know."

It's one of the questions he hopes K-State scientists can answer by studying their home-grown ticks. They've already been researching ticks for more than a decade.

"We will see this team contribute greatly to our knowledge of disease

transmission and be instrumental in developing interventions that make outdoor life safer for people, their pets and the livestock entrusted to their care," Lechtenberg said.

Until the new lab is up and running, K-State researchers are getting most of their ticks from Oklahoma State University or by collecting them in the field. They drag a white cloth through grasslands. The ticks are drawn to the white cloth and cling to it.

Deer ticks are about the size of a sesame seed before they swell with blood and increase 100 times their original size. They're about half the size of a dog tick. Both are common in Missouri and Kansas.

If white-tailed deer spend time in your back yard, chances are ticks are there waiting for a host - a squirrel, a pet, you - to brush by.

The ticks K-State buys from Oklahoma cost $1 to $1.50 each, and come in lots of 200 to 1,000. K-State researchers also have to rent animals - rabbits, dogs, sheep - to feed the ticks.

"Ticks can't feed on the same animal over and over because the animal develops immunity," Ganta said.

To breed the critters, scientist start with an engorged female ready to lay eggs in an incubator. When the larvae emerge, they are planted on an animal for their first meal. Ganta notes that the animals do not get sick from these bites by "clean" ticks but that the process allows the ticks to develop and lets scientists to study how they ultimately become pathogenic.

A tick's life cycle can run one or two years. Females die after laying eggs - 6,000 to 10,000 of them. Male ticks usually die after mating with one or more females.

A tick's bite is painless. Many people who develop flu-like symptoms, rash and fever from a bite often don't even know they've been bitten.

On the skin, a tick might look like a small scab. Use tweezers to remove it. Get as close to the host skin as possible, grab the tick head and slowly pull straight out. Drop it in alcohol and then a plastic bag and take it to a doctor to check for infection.

Making more people aware of the dangers of the tick bite, Ganta said, is part of what he wants K-State's new center to do. He believes the work he's doing in Manhattan has potential to "make a difference" around the world and goes a long way toward keeping the promise he made himself three decades ago.

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Tick types

Four species of ticks are commonly encountered in Kansas and Missouri.

Lone star tick: Females are identified by the white dot in the center of the back. Males often have dots or white streaks on the edge of their bodies.

American dog tick: Newly hatched larvae are yellow. Adults are brown. Blood-engorged females are gray.

Brown dog tick: Red-brown, elongated body without ornamentation.

Blacklegged tick: Also known as "deer tick." Legs and upper body are black.

REMOVING TICK

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