Dr. DEER

BY DR. JAMES C. KROLL

WHAT'S BUGGING YOUR HERD? PART 1



Several species of ticks feed on deer blood. Ongoing research shows these arthropods are capable of transmitting a number of diseases to humans. PHOTO BY MITCH KEZAR/WINDIGO IMAGES

One afternoon back in August 1975, North Boggy Slough wildlife manager Gene Samford and I were hiding in a brush blind, watching a strategically baited drop net. East Texas in August can be a most unpleasant place, especially in the hardwood bottoms along the Neches River. Sweat poured into our eyes, and each of us was "enjoying" his own personal swarm of mosquitoes.

Gene and his boss, Arthur Temple Jr. (then-CEO of Temple-Inland Inc.), had given me the chance of a lifetime: to prove intensive deer management would work on their property. North Boggy Slough was notorious for having chronically high deer populations but poor antler quality and low body weights. So what better place to test what then were new ideas about deer management?

Our goal was to use nets to capture as many young bucks as possible, place radio-collars on them and then track them, to see how their movements and habitat preferences changed over time. (Of course, this was being done with special permission of the state.)

We'd placed corn around the center post of the drop net, a 75-foot square suspended by five ski ropes, each with an explosive charge woven into the strands holding the net just four feet above the ground. (We'd already learned we needed to bait deer to the center of the net, because otherwise they were so fast they could escape before it reached the ground.) Only when deer were near the center post and feeding could we trigger the explosive charges.

Just prior to dark, 12 deer emerged from the dense bottom and moved slowly toward the net. Gene and I waited until all had their heads down around the center post before I threw the switch. When I did, all five charges exploded perfectly on time, and we caught all 12 deer—including

five valuable yearling bucks!

Running from the blind with our processing kit, Gene and I moved from deer to deer, trying to work them out of the tangled net. Our excitement, however, quickly turned to panic. Five deer already were dead when we reached the net! What was going on?

Working as quickly as possible, we released the survivors and began the unpleasant task of performing a necropsy (animal autopsy) on each of the casualties. The first obvious discovery was each of the deer being covered in ticks, from its ears to its belly.

We counted the number of ticks on each, and the average was 74. Some of the deer had ears grossly deformed from the damage heavy tick loads had done. In examining the internal organs, we observed the telltale signs of malnutrition and anemia. It was one of the saddest days of my career.

I have a confession to make: I hate ticks! I do for many reasons. I don't like the way they look. I don't like them crawling up my pants. And I for sure don't like pulling them off myself, my dog or my deer! I can see no reason why God designed such a loathsome creature or what helpful purpose it serves in the ecosystem. The tick only exists to propagate, pure and simple.

Now that I've made that unscientific statement, let me admit that the tick actually has its place in the deer woods. So let's take a look at this creature, as well as some other common external pests affecting whitetails and humans alike.

WHAT ARE ECTOPARASITES?

Ectoparasites generally are arthropods that live on the outside of other animals. Deer are beset by a host of these, including ticks, keds and lice. At least nine species occur on whitetails, including members of the families *Acari, Mallophaga, Anoplura* and *Diptera*. The most common ticks are from the genera *Ixodes* (black-legged tick), *Amblyomma* (Lone Star tick) and *Dermacenter* (American dog tick or wood tick).

Other parasites include mites ("chiggers," *Eutrombicula splendens*), keds (*Lipotena mazamae*), gnats (midges, *Culicoides* spp.) and chewing and sucking lice (*Tricholipeurus lipeuroides, Solenopotes binipilosus*).

Ectoparasites fall into a group of deer pathogens scientists consider "density-dependent." That is, the infestation rate tends to be related to deer density. This makes sense, as the probability of being infected is related to the number of individuals crowded into a space. Where would you expect to more likely find an outbreak of some highly contagious disease: New York City or Riesel, Texas (my hometown of few hundred residents)?

Parasites are members of what I call the "whitetail ecosystem." It includes all of the plants, animals and physical elements affecting the deer herd. Each component interacts with others. Parasites and diseases don't just infect one species — they often have complex life cycles that include more. The so-called "deer tick" is a great example. It actually should be called the "deer mouse" tick, as this mouse species represents the reservoir of Lyme disease that plagues both deer and humans.

So you'd expect to find higher densities of ectoparasites where deer populations are exceedingly high, and that was the case for North Boggy Slough. Our management program began with an effort to significantly reduce deer density through increased doe harvest. We not only accomplished our goal, but an unexpected ally appeared to help: the accidentally imported fire ant.

As ticks and other ectoparasites often have life cycles involving more than one host, and as they can move about on vegetation, there is opportunity for the much-maligned fire ant to prey on them. I now must begrudgingly credit fire ants with nearly exterminating ticks and chiggers from the Pineywoods landscape of East Texas.

However, there's a downside to this. Fire ants also have nearly eliminated insects that nourish young quail and turkeys, and that's having a deleterious effect on these important game birds. Areas too cold for fire ants haven't had this problem, but some of them do continue to have heavy loads of ticks and chiggers.

Native Americans long ago adopted what I later found to be the cheapest and best way to control ticks: They burned the forest frequently. Unfortunately, public sentiment against prescribed burning makes this less practical today than it once was.

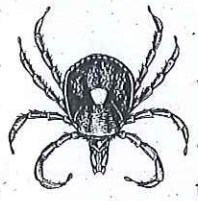


ILLUSTRATION BY ALLAN HANSEN

HOW HARMFUL TO DEER?

In most areas, whitetails deal with a variety of ectoparasites. But how much harm do they cause, other than perhaps the same irritation we hunters experience in the woods?

We can divide these external parasites into three groups: (1) those that cause discomfort and irritation but no other harm; (2) those that can have serious disease impacts on the deer herd (enzootic); and (3) those that can seriously impact humans through diseases (zoonotic). Let's look at all three.

Biting lice and keds fall into the first category, because they do little real harm to deer. But they often get the public's attention anyway.

Here at the Institute for White-tailed Deer Management & Research, we receive many emails each fall asking about strange creatures crawling all over the groin area and inner legs of harvested deer. When a photo is included, in more than 90 percent of cases these creatures prove to be keds: small flies that lose their wings shortly after landing on deer.

Keds can carry bacterial diseases,

which can in turn cause hair loss, but I've never observed any disease issue in whitetails directly attributable to keds. As the female draws a blood meal from the deer prior to mating, it's possible for keds to spread disease, but not to humans.

Ticks can cause physical harm to a deer by breaking down tissues in the ears and/or face, or in some cases causing anemia from excessive blood loss. They're also capable of carrying some nasty diseases that are passed along via their bites.

WHITETAIL TICK CONTROL

I'm often asked if anything can be done to control ticks in free-ranging deer. It's a problem we've worked on over the years. In fact, in the 1980s we experimented with methods to get chemicals such as Ivermectin into deer. The USDA conducted similar research.

We looked at two approaches. The first was to treat corn with the chemical and feed it to deer at bait stations. We found a significant reduction in tick numbers and an impressive 20 percent weight gain. We also tested a device that used paint rollers to dispense tick-killing chemicals at bait stations. As the deer fed, their faces and ears would touch the rollers, picking up the chemical.

Recently I saw a press release about similar methodologies being proposed for tick control in high Lyme disease areas. Although I feel such treatments could be effective, I don't anticipate federal agencies — especially the Environmental Protection Agency — ever approving this "off label" use on the landscape.

There also are feed manufacturers claiming to have tick-controlling substances in their deer feed, ranging from garlic extract to "magic" mineral mixes. Our testing has yet to show any efficacy of such products, though I'm sure folks will keep trying.

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TICK DISEASES IN HUMANS

Most hunters and other outdoors enthusiasts have heard of Lyme disease and know deer ticks transmit it. However, as noted, deer aren't the only culprits in this — deer mice deserve a lion's share of the blame. Lyme disease is named after the Connecticut towns



Products such as those in the Insect Shield line now can reduce human health issues due to ticks. But deer are much harder to protect.

(Lyme and Old Lyme) where it was first diagnosed. It's caused by one of three species of bacteria belonging to the genus *Borrelia*.

Unfortunately, for years many in the medical profession refused to consider it a disease. Today, though, Lyme is seen as a serious one, with long-lasting impacts on human health. Some experts argue it can't be cured, just "managed."

While Lyme disease is indeed a problem, I'm just beginning to list the potential diseases carried by ticks infesting deer. These include:

Anaplasmosis in the Northeast and upper Midwest;

Babesiosis (a red blood cell protozoan) in the Northeast and upper Midwest;

Colorado tick fever, caused by a virus;

Borreliosis (*Borrelia miyamotoi*) caused by a related bacteria similar to the one causing Lyme disease;

Ehrlichiosis in the south-central and eastern U.S.;

Heartland virus (so far only in Missouri and Tennessee);

Powassan disease in the Great Lakes states and northeastern U.S.;

Tularemia throughout the U.S.;

Rickettsia across the Gulf Coast;

Rocky Mountain Spotted Fever throughout the U.S. (in spite of the name);

STARI (Southern Tick Associated Rash Illness) in the eastern U.S.; and

Tickborne Relapsing Fever in the western U.S.

Research partner Ben Koerth and I spent six years surveying whitetails and the ticks living on them in East Texas, looking for evidence of most of these diseases. We found just three often enough to warrant concern: Ehrlichiosis, Rocky Mountain Spotted Fever and Lyme disease, in that order of frequency.

At the time of this study, few physicians had even heard of Ehrlichiosis, which once was thought to be strictly a dog disease. The lone star tick (*Amblyomma americanum*) is the primary vector, but at least three species are known to be involved.

Ehrlichiosis isn't easily diagnosed by the average doctor, as the symptoms mimic those of diseases such as flu and the common cold. These symptoms include fever, headache, pain, fatigue, nausea and red eyes, so you can see why it's difficult to recognize. Sadly, Ehrlichiosis can be fatal, with about 2 percent of victims dying from it. However, as with Lyme disease, the chronic effects are of greater concern.

Ben and I presented a series of seminars to doctors' groups in East Texas, and almost immediately the number of diagnosed cases rose

significantly. As with many other tick-borne diseases, Doxycycline is the recommended treatment for adults and children alike.

Rocky Mountain Spotted Fever is caused by a bacterium (*Rickettsia rickettsii*) that attacks the walls of blood vessels, causing a rash. There are at least two cases of this disease each year here in East Texas alone, and most go undiagnosed — even those proving fatal. It's not something to take lightly.

The best way to protect yourself against all tick-borne diseases is to pay full attention to precautionary measures each time you go to the woods, whether for hunting or some other reason. Those measures include always using an effective insect repellent and tucking your pants into your boots. And each time you return home, immediately remove your clothing and wash it.

Examine yourself closely for any ticks (large or small) that might already have imbedded themselves. The sooner they're removed, the less likely they are to infect you with some pathogen.

Lastly, if you're bitten, pay attention to the area for several days. Look for rashes or discolored rings around it, as these are potential signs of a problem. When in doubt, see a physician and *insist* on serious consideration of potential disease issues. Be sure to report any symptoms discussed earlier if they're present.

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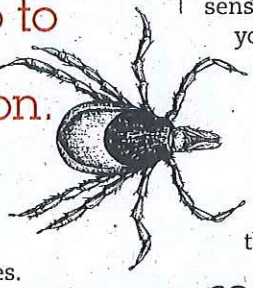


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IN CONCLUSION

The whitetail woods are a marvelous place full of wonderful experiences and a lifetime of memories. But they also can harbor dangers for deer and people alike. With a little common sense and care, you can minimize your own chances of contracting arthropod-vectored diseases. You also can do your part to help manage the deer herd and its ecosystem.

Of course, by now you might have decided never to go into the deer woods again!

COMING NEXT MONTH

In Part 2 of our look at whitetail pests, we'll examine the latest findings on how flying insects can lead to outbreaks of epizootic hemorrhagic disease and other serious maladies in the herd — including anthrax.



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