

What Makes Lyme Disease Tick?

By Brian Bret, Ph.D.

Lyme disease is rapidly becoming an important public health concern. This potentially debilitating illness is now the most common tickborne disease in the United States, and a likely place to get it is right in your backyard.

Reports of the disease are likely to increase as more people become aware of its causes and symptoms and seek medical help for proper diagnosis and treatment.

At the same time, the bacteria responsible for the disease is certain to increase for two reasons. First, the deer tick that transmits the disease from one host to another appears to be exploding in population. Second, the deer tick, the bacteria and the disease are spreading widely throughout most of the continental United States by mammals and birds that act as hosts for the ticks.

A recent article in *USA Today* stated that scientists now believe the bacteria causing Lyme disease was present in this country long before it became officially recognized in 1975. Therefore, instances of Lyme disease that occurred decades before were probably misdiagnosed because the disease was not known.

Recognizing the Symptoms

Lyme disease has a variety of symptoms, which makes it difficult to diagnose. It can also mimic other diseases such as Alzheimer's disease and certain neurological disorders.

One of the first signs of Lyme disease is a reddish, purplish or brownish rash around the site of the tick bite. The rash expands from the center out and may look like a bull's-eye with red rings inside other red rings. However, not everyone who contracts Lyme disease will experience a rash. In some cases, the rash can go away without the infected person realizing what it is. Other early symptoms, which can occur within 32 days of the tick bite, include swollen lymph nodes near the bite, flu-like symptoms, headache, fever, chills, stiff neck, nausea and fatigue.

Other Symptoms

Other symptoms that can occur later include overall body weakness, severe headaches, Bell's palsy, carpal tunnel syndrome, dizziness, seizures, disorientation, muscle and joint pain, neurological and cardiac problems and arthritic symptoms. Later symptoms can occur months to years after the person is infected.

If you think you might have been exposed to Lyme disease, contact your doctor immediately. It can be detected with a blood test and treated with antibiotics in the early stages.

Life Stages

The deer tick has a two-year life cycle, but goes through four life stages—egg, larvae, nymph and adult. In late spring or early summer, female adult deer ticks drop off their hosts and lay eggs on the ground. After about a month, the eggs hatch into seed ticks, which are six-legged larvae.

Soon after hatching, the larvae begin searching for hosts from which to feed. The larvae do most of their questing for hosts in leaf litter and the forest floor and do not climb high. For this reason, the primary host is the white-footed mouse, and it is at this stage that the tick acquires the Lyme disease bacteria (called a spirochete in the scientific community), from infected mice. Tick hosts can also include other small ground

dwelling mammals such as voles or some ground nesting birds. Newly hatched larvae are not infected with the Lyme disease bacteria. They usually pick it up from the infected host as they feed.

After feeding two to three days on the host, the larvae drop off on the ground and overwinter in leaf litter, thatch or soil. The next spring, they molt into eight-legged nymphs and still carry the infection.

Nymphs occur in late spring or early summer of the second year. Their populations peak in early or midsummer. Soon after molting, nymphs begin searching for hosts to feed on. Unlike the newly hatched larvae, nymphs are not restricted to ground level when searching for suitable hosts. They climb grasses and weeds. It is at this stage that humans are most susceptible to ticks. Other common nymph hosts include medium size mammals and birds. If the nymph is infected with the spirochete, it will pass it on to the next host it feeds on.

The average infection rate of nymphs is about 25 percent. This means that if you're bitten by a nymph, you have a one in four chance of being bitten by an infected tick. In some areas of the country, this rate can be significantly higher.

After a few days of feeding on their hosts, engorged nymphs drop to the ground and remain there until their final molt. By late summer or early fall, nymphs are molting into adults. Adult populations peak in midfall. If a nymph has been infected with the disease, it will carry it into adulthood as well.

Adult ticks climb shrubs and tall grasses in search of hosts. The most common host is the white-tail deer. Other large hosts include dogs and humans. After feeding for a few days, the adults drop off and overwinter. Adults can also be found the following spring. The infection rate of adult ticks can range from 40 to 50 percent.

Making Your Property Less Hospitable to Ticks

The control of Lyme disease provides an ideal opportunity for an integrated pest management approach. Control methods must include mechanical, physical and chemical methods aimed at the ticks and their hosts. However, no control program can guarantee that a person will never get Lyme disease.

If a tick does not find a host soon after it hatches or molts, it will die. Therefore, making your property less hospitable to tick hosts such as deer, white-footed mice, birds, squirrels, chipmunks and other mammals is helpful in controlling the spread of Lyme disease.

However, controlling hosts is not always possible or desirable over large areas. For instance, getting rid of deer populations would only affect adult ticks, and getting rid of white-footed mice would only affect larvae and nymphs. Likewise, controlling the dozens of species of birds and mammals that are supplemental hosts would probably be impossible.

Yet, homeowners can take steps to limit host populations—especially rodents—around their property. The following are some suggestions for making property less desirable as habitat for tick hosts.

- Keep lawns mowed.

(Continued on Page 17)

Proper Planting—

(Continued from Page 10)

the winter. To protect individual trees from mice, place a cylinder of ¼ inch mesh hardware cloth or plastic drain pipe (it should not be black in color) around the trunk. The cylinder should extend high enough to prevent animals from feeding at snow level, and should be firmly anchored in the soil without disturbing the tree roots. Protection from rabbits requires coverage of up to 1 to 2 feet above snow level. Other means of fencing or animal control may be needed. If many trees and shrubs are to be protected, application of a commercial repellent may be more practical. The repellent can be sprayed or painted on the trunks and branches. The effectiveness and duration of the repellent will depend on the severity of the winter and the availability of other food.

*Adapted from Minnesota Extension Service publication (AG-FO-3825) "Planting and Transplanting Trees and Shrubs" by Bert T. Swanson, James B. Calkins, Peter-Jon Rudquist, and Steven Shimek.

Lyme Disease—

(Continued from Page 4)

- Keep weeds cleared and shrubs trimmed.
- Clean up leaf piles and organic debris and do not allow it to accumulate.
- Move wood piles away from the house and play areas.
- Inspect your home for possible entry sites for rodents.
- Move bird feeders away from living or play areas.

Dress the Part When Outdoors

The threat of getting Lyme disease shouldn't keep anyone

from enjoying the outdoors. If you plan on being in a tick-prone area, dressing properly is one way of reducing your chances of coming into contact with ticks.

- Wear light-colored clothing, so ticks will be easier to spot.
- Wear long-sleeve shirts with collars.
- Wear long pants.
- Tuck your pants into the top of your boots or inside your socks.
- Wear your hair tucked up into a cap away from your neck.
- Use an effective insect repellent.
- After being outside, check yourself for ticks, and shower or bathe thoroughly before going to bed.

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