

seen by Westerners for 50 years—like the spectacular red Temminck's Tragopan. King thinks the political situation could easily deteriorate, but as long as it is stable, China will be an increasingly popular birding destination. And with its wooded areas at only 16% of the world average, and diminishing, ecotourism is one of few conservation supports.

Taking advantage of changes in the USSR, King also made an exploration trip to Ussuriland, in south-eastern Siberia. He plans a 1993 tour there, conjecturing that that area's availability will survive the Russian turmoil. It may be particularly interesting to people who have seen vagrant Siberian birds, perhaps buntings, passing through Alaska, and want to see them *en masse* on their breeding grounds, says Whitney.

King is also one of the few tour operators with good local contacts in the Philippines, providing guides to their rapidly receding forests, with over 170 endemic species, including the gigantic endangered Monkey-eating Eagle. "Ecotourism is just about the only weapon we've got," he says, but concedes that it's just David against Goliath governments who are allied with the multi-billion-dollar lumber industry.

And he gets letters from rainforest action groups suggesting that he boycott such countries. "In conservation literature they print letters pro, con, and on the fence. Every one of them is right," he says. But like the other touring company founders, he believes, "The people that go there develop a constituency that conservationists can call on. Most people won't write letters to places they haven't been and don't know about."

JESSICA COHEN is a New York City-based magazine writer.

## LYME DISEASE: PREVENTING THE PREVENTABLE

by Jo Ann Heltzel

*Lyme Disease has already hurt birders and birding. Unless we become better educated, it will damage us and our birding pursuits in the future.* —THE EDITORS

FOR THE LAST SEVERAL YEARS LYME disease has featured prominently in the news. We have all heard about the dangers of the disease; perhaps you even know someone who has had the characteristic bull's-eye rash and received an early diagnosis and treatment. Unfortunately, many people miss the early warning signs, developing chronic Lyme disease, which is difficult to both diagnose and treat.

But Lyme disease is a preventable illness. While there are no guarantees, understanding what to look for, what behaviors can increase or

diminish your risk of contracting Lyme disease, and making the appropriate adjustments in your activities will greatly increase your chances of prevention.

Lyme disease has been known in Europe for more than 100 years. However, it first appeared on the eastern shores of the United States in the middle 1940s. Apparently, infected deer ticks and Lyme disease spread inland from coastal towns along Long Island and Connecticut, transmitting the disease to several states in New England and the upper northcentral Midwest. By 1990, forty-eight states, excepting only Hawaii and Arizona, reported Lyme disease to varying degrees. The first reported United States case was in 1970 in Wisconsin. Today, Lyme disease is found on all continents except Antarctica, although incidence of the disease remains highest from Massachusetts to Pennsylvania, and in Wisconsin, Minnesota, and north central California.

As a birder, the hours you spend outdoors in fields and marshes can increase the likelihood of contracting Lyme disease. Many believe migrating birds play the major role in transporting infected deer ticks across great distances, especially as



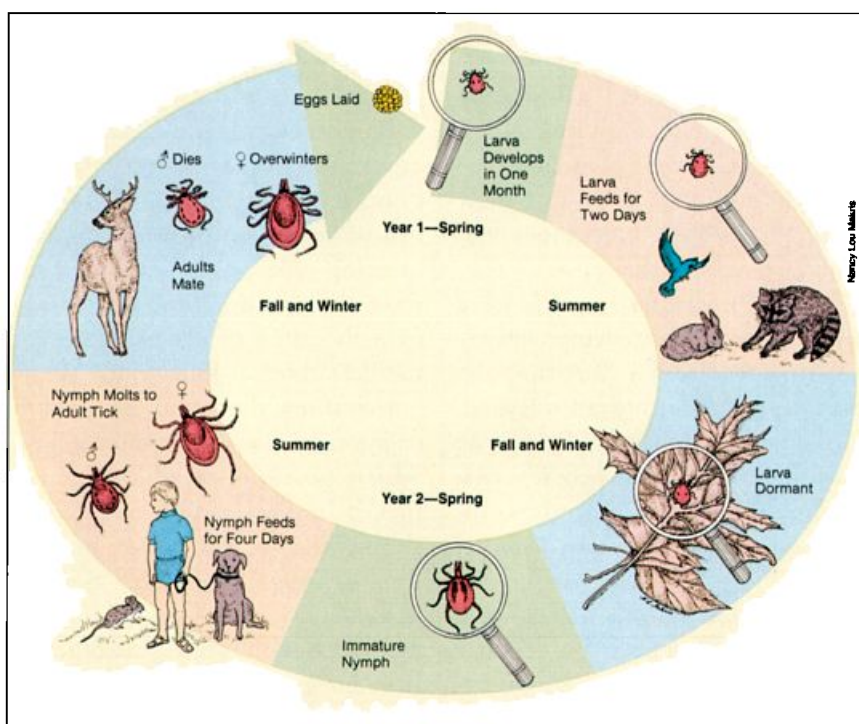
American dog tick, adult female (left), and deer tick, nymph (right), in palm of hand with penny.

Lyme disease is spreading along migratory bird flyways. No longer confined to grassy open fields and wooded areas, Lyme disease is established in many suburban backyards and neighborhoods, carried there by field mice and songbirds. The numbers of infected deer ticks in rural, suburban, and urban areas grow each year; few places are risk-free.

Deer ticks progress through a two-year life cycle, remaining most active during the spring, summer, and fall. In endemic regions where Lyme disease occurs on a continuing and widespread basis, only 10% of the human cases are reported during the winter months, although veterinarians report Lyme disease throughout the year. Only when the temperatures are consistently below 40° Fahrenheit and snow covers the ground are deer ticks dormant, and risk is nil. Fortunately, most people do not live in these conditions year round; unfortunately, that means they are at risk.

In the spring, eggs are laid on dry leaves and twigs in forest debris and leaf litter. One month later the eggs hatch into exceedingly small, six-legged larvae, often called seed ticks or moving dust. Larvae feed on animals close to the ground such as mice, ground-feeding birds, chipmunks, and rabbits. It is by feeding on infected animals that larvae become infected with spirochetal bacteria causing Lyme disease (*Borrelia burgdorferi*). Once infected, the tick carries bacteria throughout subsequent stages of development. The primary reservoir for these bacteria are white-footed field mice which, while having a high infection rate, do not actually succumb to Lyme disease themselves.

During the spring of the second year, immature eight-legged nymphs emerge, about one-fourth the size of adult female deer ticks. Elongated mouthparts for extended feeding



This illustration depicts the 2-year life cycle of a deer tick.

and a discernible orange-brown coloring on the border of their bodies characterize both nymph and adult female ticks. From May to September, or even later in warmer climates, deer ticks actively seek host blood meals from tips of vegetation, usually grasses ranging in height from a few inches to a foot or more.

Deer are the preferred hosts of the adult tick, but larger animals including dogs, horses, cows, or humans also serve as hosts. Feeding ticks commonly seek out warm, moist skin folds or protected areas around the eyes, ears, and mouth. Both nymph and adult female deer ticks feed for several days, but the Lyme disease bacteria are passed on to their host within the first 12–24 hours of feeding. Scientists believe nymphs cause about 80% of human cases of Lyme disease because their small size makes them difficult to detect. And, though infected, the adult male deer tick does not transmit Lyme disease.

Understanding the deer tick life cycle, where they “quest,” and the

very small size of them can greatly reduce the risk of contracting Lyme disease. However, the most important preventive measure you can take is to thoroughly check your body for crawling or attached ticks, and frequently brush your clothes and skin while outdoors in order to remove crawling ticks. Once indoors, visually inspect every inch of your skin, paying particular attention to skin folds behind the knee, in the groin and abdomen, navel, underarms, and neck.

Next, gently run your fingertips over the skin and through the scalp. If an attached tick is felt, remove it carefully using fine-bladed splinter tweezers. With the tweezers, grasp the tick close to the skin, pulling gently for 15 - 30 seconds to loosen the tick. Do not grasp the body of the tick, as squeezing the body may expel bacteria into your bloodstream.

Be sure to wash the bite thoroughly with rubbing alcohol or hydrogen peroxide, and observe it closely for at least thirty days for any

unusual appearance or reddening of the skin. It is estimated that 60-70% of individuals develop a spreading red rash at the bite, indicating bacteria in the skin. Even so, many people who are infected do not show signs; in children, only about half actually develop a skin rash.

Typically the rash resembles a bull's-eye with a clear center and expanding red border, but the rash may also be uniformly red, streaked, or irregular in shape. During the first month, infected people often experience flu-like symptoms, including joint and muscle aches, fever, chills, headache, neck stiffness, swollen lymph nodes, sore throat, and fatigue. At this early stage, Lyme disease is readily treatable by a physician. However, due to the similarity of these symptoms to the flu or a cold, many people initially overlook their infection, becoming extremely ill later.

In later disease stages, the symptoms are diverse and confusing, involving the joints, muscles, heart, skin, eyes, nervous system, memory, and mental capacity accompanied by unremitting fatigue. Once diagnosed, chronic Lyme disease treatment is costly, sometimes prolonged, and not always curative. Therefore, if in the month following

a deer tick bite, you experience any symptoms you should visit your physician.

In addition to body-checking, other measures can reduce risk. Because deer ticks climb upward to the tips of vegetation, brushing against questing ticks allows them to continue the upward climb on the human in search of exposed skin for the next three or four hours. Wearing clothing that exposes less skin delays tick attachment and feeding. When possible, wear long pants tucked into socks and long-sleeved shirts tucked in at the waist. In addition, wearing light-colored clothing makes crawling ticks easier to spot. Another option is using insect repellent; however, many aren't very effective on ticks, and none can substitute for body-checking. For instance, products containing 30% or more DEET (diethyltoluamide) repel insects on the skin, but are less effective against ticks. Additionally, repeated application of DEET products to small children can result in serious medical problems if an overdose occurs. There are also products intended for application to clothing, which contain 0.5% permethrin. While this substance does effectively repel and kill ticks, permethrin products are not intended for the

skin, and their effectiveness deteriorates once exposed to sunlight.

A few simple and effective precautions you can take when birding include walking in the center of cleared trails away from grassy vegetation, and removing brushy, weedy areas around the home that attract nesting mice. Place birdfeeders away from the home since dropped seeds invite tick-infested mice and other rodents, and mice often nest in birdhouses. And, if you live in the country and have deer in your area, try to discourage them from entering the yard, perhaps by building a fence.

Household pets also transport ticks from grassy fields, and should be examined for crawling or attached ticks, especially around the eyes, ears, and nose. In addition, veterinarians can recommend tick sprays, powders, collars or even vaccinations with a conditionally-approved canine vaccine for Lyme disease.

Preventing Lyme disease means taking every reasonable precaution to avoid contact with the tiny deer ticks, checking and brushing your body frequently, immediately removing any ticks you find, and seeking medical care if any suspicious rash or flu-like symptoms appear.

The impact of chronic Lyme disease is far-reaching and frustrating. Risky behaviors that go hand-in-hand with birding activities must be balanced by sensible risk-reducing behaviors that become good preventative habits. Understanding Lyme disease and its prevention replaces ill-informed fears about Lyme Disease and its spread. ■

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**The rash on this man's shoulder is a characteristic sign of Lyme Disease.**