



TICKS

Prepared by Kirby C. Stafford III, Ph.D. (April 2001)

The Connecticut Agricultural Experiment Station, 123 Huntington St.-Box 1106, New Haven, CT 06504
(203) 974-8485, Web site - <http://www.caes.state.ct.us>

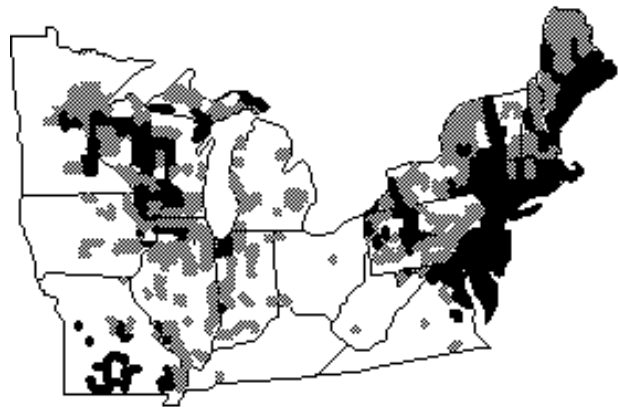
Ticks feed on blood and require an animal host to survive and reproduce. Ticks can be a nuisance; their bites can cause irritation and, in the case of some ticks, paralysis. Ticks also can transmit several human and animal disease pathogens. Additional information is available from the Experiment Station fact sheets on *Tick-Associated Diseases*, *Tick Bite Prevention*, *Tick Control*, and the *American Dog Tick*.

In Connecticut, the two most common ticks are the black-legged tick, *Ixodes scapularis* (commonly known as the deer tick) and the American dog tick, *Dermacentor variabilis*.

■ Established ■ Reported

Ixodes scapularis . . .

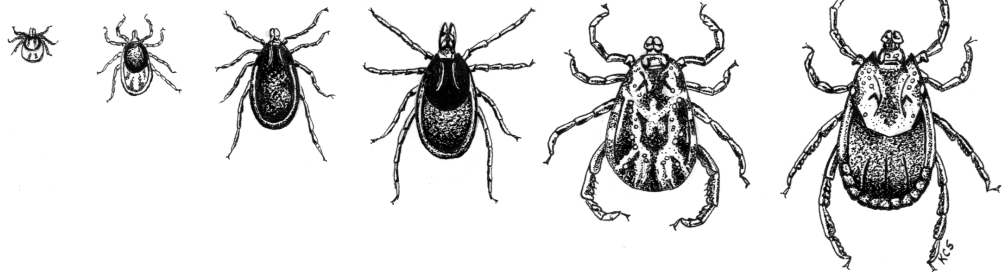
Three diseases, Lyme disease, caused by *Borrelia burgdorferi* (a type of bacterium), human babesiosis, caused by a protozoan, *Babesia microti*, and human granulocytic ehrlichiosis (a bacterial infection) are spread by the bite of *I. scapularis*. This tick is found from coastal Maine through the mid-Atlantic states and in several north central states, particularly Wisconsin and Minnesota. This tick is also found throughout the southeastern United States. In the southeast, few *I. scapularis* have been found infected with *B. burgdorferi*. On the Pacific coast, particularly northern California, Lyme disease is spread by the western blacklegged tick, *I. pacificus*.



Approximate distribution of *I. scapularis* in the northeastern and north central states. (Centers for Disease Control and Prevention)

Left to right: larva, nymph, male and female *Ixodes scapularis*, and male and female of *Dermacentor variabilis*

Actual sizes with addition of engorged female *Ixodes*

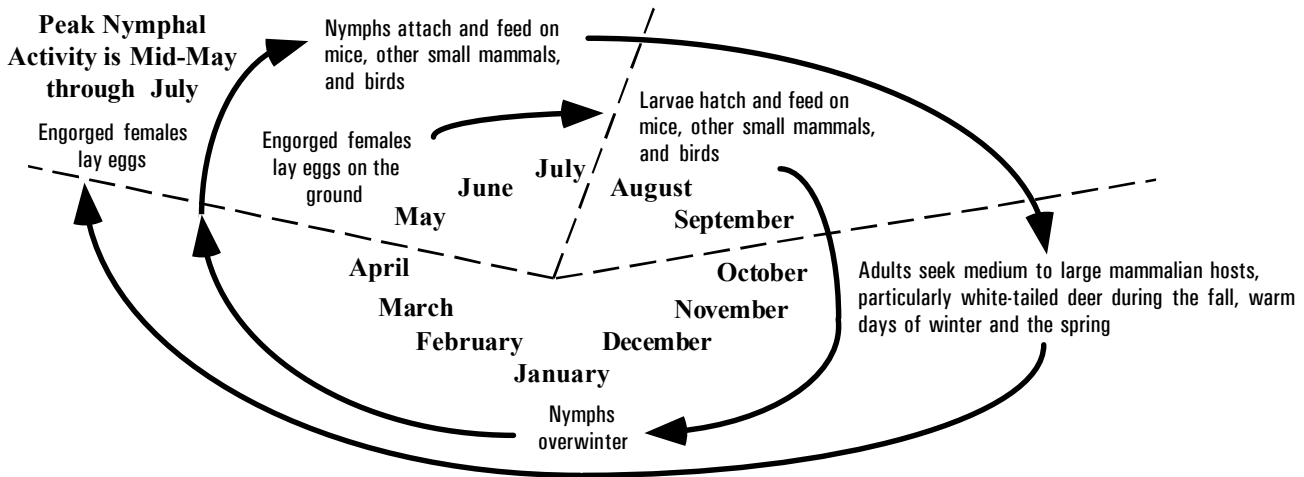
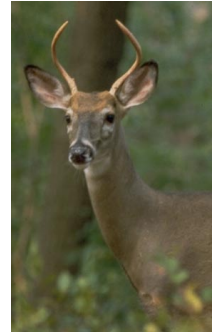


Dermacentor variabilis . . .

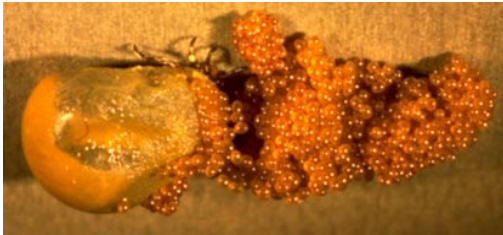
The American dog tick is found throughout the eastern United States and is widely distributed in Connecticut. This tick is not known to spread Lyme disease, although it can transmit the causal agent of Rocky Mountain spotted fever. The adult tick is the only stage encountered by people and pets. Adults become active about mid-April to early May and remain a nuisance until August. Adult dog ticks can be distinguished from adult *I. scapularis* by their larger size and the white markings on the upper body surface. Female *I. scapularis* have a dark brown dorsal "shield" located behind the mouthparts, and when unengorged, have a reddish brown body. Male *I. scapularis* are smaller than the female and are completely dark brown. Engorged female *I. scapularis* are nearly as large as an engorged American dog tick and the two have been confused. For more information about the American dog tick, see the Experiment Station fact sheet on this tick.

Two Year Life Cycle of *Ixodes scapularis*...

The blacklegged tick has four stages; egg, larva, nymph, and adult (male and female). This tick feeds on a wide variety of mammals and birds. The larvae, nymphs, and adults feed only once and slowly; requiring 3-5 days to ingest the blood, depending on the stage of the tick. Larval *I. scapularis* are rarely infected with *B. burgdorferi*. Larvae and nymphs typically become infected with Lyme disease bacteria when they feed on infected white-footed mice (*Peromyscus leucopus*), chipmunks (*Tamias striatus*), or certain species of birds. The white-footed mouse is the principal source (reservoir) of *B. burgdorferi*, *Babesia microti*, the agent of human babesiosis in the east, and the agent of human granulocytic ehrlichiosis. White-tailed deer are the principal host for the adult ticks and tick abundance is closely linked to the abundance of these animals. Deer are not reservoirs for Lyme disease.



Below: Female *I. scapularis* lays eggs from which larval ticks will emerge. Larval ticks acquire the Lyme disease spirochete when they feed on an infected white-footed mouse. Nymphal ticks will infect a new generation of mice to maintain the Lyme disease cycle.



Female *I. scapularis* with eggs (K. Stafford)



White-footed mouse (K. Stafford)

The zoonotic or "wild" cycle for *B. burgdorferi* is maintained by the two-year life cycle of the tick. Seasonally, the nymphs precede larvae and infect a new generation of animal hosts. Larvae active later in the summer then become infected when feeding on infected host animals. Approximately 20% of the nymphs in Connecticut, on average, are infected with *B. burgdorferi*, although this can vary from about 10 to 30% in any given year. Adults of *I. scapularis* are more heavily infected with *B. burgdorferi* (30-60%) than the nymphs because the tick has had two opportunities to become infected, once as a larva and once as a nymph. Experiment Station scientists and epidemiologists at the Connecticut Department of Public Health have found a close association between the abundance of *I. scapularis* nymphs infected by *B. burgdorferi* and the incidence of Lyme disease in Connecticut.

Sampling for ticks. . .

A "tick drag" or "tick flag" may be used to determine if ticks are present. To construct a tick drag, attach one edge of a square yard piece of white, heavy flannel or corduroy material to a 3 foot long wooden dowel and tie a rope to each end of the wooden dowel. Curtain weights can be attached to the opposite end to help hold the cloth to the ground. Drag the cloth over the lawn and leaves and check for ticks. A "tick flag", which is easier to use on vegetation, is similar to a tick drag, but is built just like a flag. Only a small proportion of the ticks present will be picked up this way, so several drags should be done before concluding there are few or no ticks. Tick drags will not work when the grass or vegetation is damp or wet. **Precautions to avoid tick bites should be taken when sampling for ticks.**