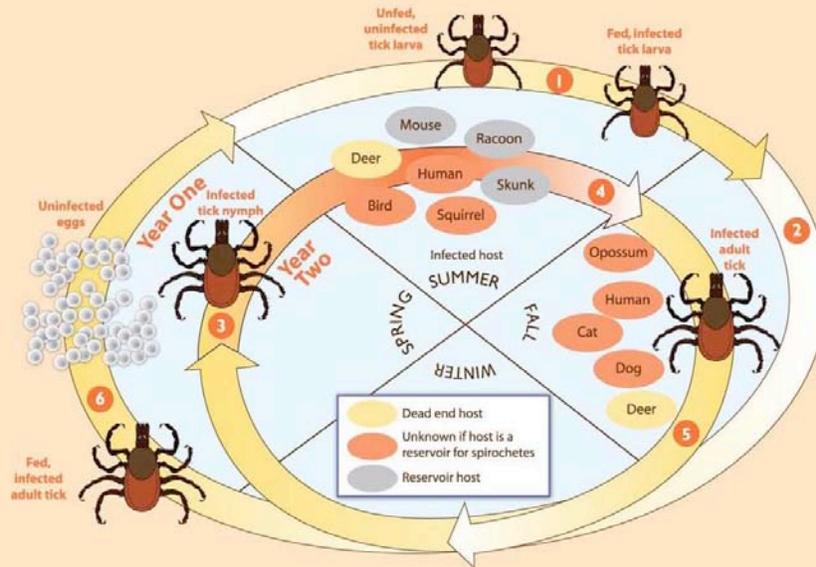


## Two-year Life Cycle of the Deer Tick



The deer tick — *Ixodes scapularis* — lives its two-year life cycle in four stages, from egg to larva to nymph to adult. Each spring the larvae emerge from eggs that were laid the previous fall. These pinhead-sized, six-legged larvae must have a blood meal to grow into

nymphs. In fact, each tick will need a new blood meal to advance to the next stage of its life. Because Lyme disease is transmitted to the tick through the blood of its host, the host's life cycle is closely tied to the life cycle of the tick.

1 – Soon after hatching in spring of Year One, tick larvae find their first host and take a blood meal. They generally feed on a small to medium host, such as a white-footed mouse, skunk, or raccoon. These animals are **reservoir hosts** (a host animal that maintains a pathogen in its body without becoming sick or dying) for *Borrelia burgdorferi* (the Lyme disease bacterium). If the reservoir host is infected, the tick will acquire *B. burgdorferi* and therefore remain infected – and able to transmit the pathogen – for the rest of its life.

2 – After slowly feeding for several days, the tick larva will drop to the ground and reenter the ground cover (such as leaf litter) that protected it during the egg and early larval stages. There it will molt to an eight-legged nymph and overwinter until the spring of Year Two.

3 – As the weather becomes warmer the following spring, the larger tick nymph will actively seek a new host for its second blood meal. Ticks can detect host odors (including carbon dioxide, ammonia, lactic acid, and other body odors), body heat, moisture, and vibrations. Tick nymphs will typically feed from a small to medium sized host but will take a blood meal from any available host, including humans. If an infected tick nymph feeds on a human, it can transmit the Lyme disease pathogen. If the nymph is not infected, it cannot transmit the bacterium. However, if the uninfected nymph feeds on an infected reservoir host, this second blood meal provides another opportunity to acquire the pathogen.

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4 – Once fully fed, the tick nymph drops off the host and molts into an adult tick. Adults of *Ixodes scapularis* are more commonly infected with *B. burgdorferi* than the nymphs because the tick has had two opportunities to become infected – once as larvae and once again as a nymph.

5 – The adult *I. scapularis* tick must obtain one more blood meal, generally from a medium to large-sized animal. The white-tailed deer is the principal host for the *I. scapularis* and is considered to be a **dead-end host** for the bacterium. The deer is the final blood meal for the tick and, even if the bacteria are transmitted to the tick, no pathogens will be passed on to a new host. Adult ticks will often overwinter right on the deer.

6 – As the weather warms again, the female *I. scapularis* will lay up to 2,500 eggs and die. The eggs will hatch and the cycle will begin again.

## Two-Year Lifecycle of the Deer Tick – REVIEW

### Vocabulary Matching:

- |          |                                |
|----------|--------------------------------|
| A. Egg   | E. Reservoir Host              |
| B. Larva | F. Dead End Host               |
| C. Nymph | G. <i>Ixodes scapularis</i>    |
| D. Adult | H. <i>Borrelia burgdorferi</i> |

- \_\_\_ 1. Scientific name of deer tick
- \_\_\_ 2. Stage most likely to be infected with bacterium
- \_\_\_ 3. Host for final blood meal (white-tailed deer) – even if bacterium is transmitted to tick, no pathogens will be passed on to new host
- \_\_\_ 4. Pathogen – a microbe or microorganism that causes disease in a plant or animal host
- \_\_\_ 5. Only stage of tick development that can never be infected with Lyme disease bacterium
- \_\_\_ 6. Non-adult intermediate stage with 6 legs
- \_\_\_ 7. Non-adult intermediate stage with 8 legs
- \_\_\_ 8. Host animal that maintains pathogen in its body without becoming sick or dying
- \_\_\_ 9. Stage that overwinters on a white-tailed deer
- \_\_\_ 10. Scientific name of bacterium that causes Lyme disease

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1. Do ticks undergo incomplete or complete metamorphosis? \_\_\_\_\_

How do you know? \_\_\_\_\_

2. Why are adult *Ixodes scapularis* more commonly infected with *B. burgdorferi* than nymphs?

\_\_\_\_\_

3. Where do larvae and nymphs overwinter? \_\_\_\_\_

4. How do ticks detect a host? \_\_\_\_\_

\_\_\_\_\_

## Two-Year Lifecycle of the Deer Tick – REVIEW (Answer Key)

### Vocabulary Matching:

- |          |                                |
|----------|--------------------------------|
| A. Egg   | E. Reservoir Host              |
| B. Larva | F. Dead End Host               |
| C. Nymph | G. <i>Ixodes scapularis</i>    |
| D. Adult | H. <i>Borrelia burgdorferi</i> |

- \_G\_ 1. Scientific name of deer tick
- \_D\_ 2. Stage most likely to be infected with bacterium
- \_F\_ 3. Host for final blood meal (white-tailed deer) – even if bacterium is transmitted to tick, no pathogens will be passed on to new host
- \_H\_ 4. Pathogen – a microbe or microorganism that causes disease in a plant or animal host
- \_A\_ 5. Only stage of tick development that can never be infected with Lyme disease bacterium
- \_B\_ 6. Non-adult intermediate stage with 6 legs
- \_C\_ 7. Non-adult intermediate stage with 8 legs
- \_E\_ 8. Host animal that maintains pathogen in its body without becoming sick or dying
- \_D\_ 9. Stage that overwinters on a white-tailed deer
- \_H\_ 10. Scientific name of bacterium that causes Lyme disease

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1. Do ticks undergo incomplete or complete metamorphosis? \_\_\_INCOMPLETE\_\_\_\_\_

How do you know? \_\_\_NO PUPAL OR COCOON STAGE\_\_\_\_\_

2. Why are adult *Ixodes scapularis* more commonly infected with *B. burgdorferi* than nymphs?

HAS TWO OPPORTUNITIES TO BECOME INFECTED – AS LARVA, THEN AS NYMPH

3. Where do larvae and nymphs overwinter? UNDER GROUND COVER (LEAF LITTER)

4. How do ticks detect a host? 1) ODORS – CO<sub>2</sub>, AMMONIA, LACTIC ACID, BODY ODORS 2) BODY HEAT 3) MOISTURE 4) VIBRATIONS

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