

Ticks

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Twelve species of ticks are known to occur in Ohio. The brown dog tick, *Rhipicephalus sanguineus*, is the only species that can become established as a pest in homes and kennels. Three tick species are medically important because they are disease vectors: the American dog tick, *Dermacentor variabilis*; the lone star tick, *Amblyomma americanum*; and the blacklegged tick (also commonly called the 'deer tick'), *Ixodes scapularis*. The remaining tick species are rarely encountered. All ticks are parasites that feed on the blood of animals.

Identification

Not all ticks cause human disease, so it is important to properly identify the tick species when determining disease risk. Many of the species in Ohio, including the three of medical importance, are hard ticks. They are called hard ticks because they possess a scutum (hard plate) on their upper surface just behind the mouthparts. The scutum covers almost the entire upper surface of the adult male whereas it covers only the front portion of the female. Soft ticks lack a scutum. In Ohio, soft ticks are not pests of humans.

Tick adults and nymphs have eight legs whereas the larvae (first stage) have six. Adult ticks often have distinct characteristics and markings, but immature stages are completely tan or brown and difficult to identify to species. All stages are round to oval shaped; they are flattened prior to obtaining a blood meal. The adult female greatly increases in size after feeding but adult males do not. Nymphs become engorged, but they are much smaller than the adults.

Important Tick Species in Ohio

Brown Dog Tick *(Rhipicephalus sanguineus)*

The adult brown dog tick is reddish brown. Unfed adults are about 1/8 inch long. After feeding, the female is much larger (~1/2 inch long), bluish gray, and oval shaped. All stages of the brown dog tick have a pair of small eyes.

Unlike other tick species, the brown dog tick can complete its entire life cycle indoors. The brown dog tick is well adapted to survive in the warm, dry conditions inside and outside home environments. These ticks do not thrive in wooded areas. Nonetheless, they may occur in grassy and bushy areas adjacent to homes and kennels, roadsides, and footpaths.

Brown dog ticks rarely attack humans. Rather, dogs are their preferred host. All stages of the brown dog tick feed on dogs and they may attach anywhere on its body.



Brown dog tick adult male (left) and female (right).
(Photo by J. F. Butler, courtesy of University of Florida)

However, adult ticks typically attach on the dog's ears and between its toes, whereas larvae (seed ticks) and nymphs typically attach on the dog's back. After feeding, they drop off the host but do not travel far. Brown dog ticks can complete a generation in approximately 60 days with optimal temperatures and readily available dog hosts.

Brown dog ticks can transmit Rocky Mountain spotted fever and several other disease organisms to dogs.

**American Dog Tick
(*Dermacentor variabilis*)**

The adult American dog tick is brown with light grey mottling on the upper surface. The unfed adult female is about 3/16 inches long. After feeding, she is much larger (~5/8 inches long), mostly gray, and oval shaped. The male, whether fed or unfed, is ~1/8 inch long. All stages of the American dog tick have a pair of very small eyes.

American dog ticks occur primarily in overgrown vacant lots, fallow farm fields, weedy roadsides, and edges of paths and hiking trails. The immature stages of this species feed on rodents and other small mammals. Unfed larvae and nymphs crawl about actively seeking a host. After feeding, larvae and nymphs drop to the ground where they seek shelter and digest the blood meal before molting (shedding the skin).

Adults of the American dog tick are most abundant from mid-April to mid-July. Adult ticks feed on a wide variety of medium to large size mammals, such as raccoons, ground hogs, opossum, dogs, and humans. The adult tick waits on grass and weeds for a suitable host to brush against the vegetation. It then clings to the fur or clothing and crawls upward seeking a place to attach and feed.

The adult male obtains a brief blood meal then mates with the female on the host. The adult female feeds for 7 to 10 days then she drops to the ground and remains there for several days before laying several thousand eggs. The female dies shortly thereafter. The male remains on the host and continues to feed and mate for the rest of the season until his death.

American dog ticks are the primary transmitter of Rocky Mountain spotted fever. They also may transmit tularemia. The bite of the American dog tick also may cause tick paralysis in dogs and humans.

**Lone Star Tick
(*Amblyomma americanum*)**

The unfed adult female is about 1/8 inch long, brown, with a distinctive silvery spot on the upper surface (hence the name 'lone star'). Once fed, the female is almost circular in shape and ~7/16 inch long. The male tick is about 1/8 inch long, brown, with whitish marking along the rear edge. All stages have a pair of small eyes.

Lone star ticks are common in the southern half of Ohio. All stages can be found throughout the warm months of the year. This species typically occurs in shady locations along roadsides and meadows and near the edges of wooded areas. All stages crawl to the tip of low growing vegetation and wait for a host to pass by. All stages feed on a variety of bird and mammal hosts, including humans.

Lone star ticks are the primary transmitter of human monocytic ehrlichiosis (anaplasmosis). They also may transmit tularemia and Q-fever. This species is a minor vector of Rocky Mountain spotted fever.



Various stages of the American dog tick: larva, nymph, adult female, adult male (counterclockwise from upper right; sesame seed shown for size comparison).
(Photo by Kent Loeffler, courtesy of Cornell University)



Various stages of the lone star tick: nymph, adult female, adult male (counterclockwise from upper right; sesame seed for size comparison).
(Photo by Kent Loeffler, courtesy of Cornell University)

Blacklegged Tick **(*Ixodes scapularis*)**

The larval stage of the blacklegged tick is about the size of a poppy seed and nearly translucent, which makes it extremely difficult to see. The nymphal stage is translucent to slightly gray or brown. Adult males are ~1/16 inch long; unfed females are larger (~1/8 inch long). Both sexes are a dark chocolate brown color, but the rear half of the adult female is red or orange. When fed, they may appear gray. All stages lack eyes.

Blacklegged ticks are found mostly in or near forested areas. The immature stages of this species feed on birds, rodents (mice, voles, chipmunks, squirrels, etc.) and other small to medium size mammals such as dogs, raccoons, opossum, etc. Adult blacklegged ticks feed on large mammals, most commonly white-tailed deer. Hence, some people call them 'deer ticks'. All stages may attach to humans.

The blacklegged tick (*Ixodes scapularis*), the principal vector of Lyme disease, is rare in Ohio. The most commonly encountered *Ixodes* tick in Ohio is the groundhog tick, *Ixodes cookei*, which does not transmit Lyme disease. There are many other *Ixodes* ticks in the United States and only an expert can identify them to species.

In addition to transmitting Lyme disease, blacklegged ticks are the principal vectors of babesiosis and human granulocytic ehrlichiosis. This tick species may be co-infected with several disease agents.



Various stages of the blacklegged tick: nymph, adult female, adult male (counterclockwise from upper right; sesame seed for size comparison).

(Photo by Kent Loeffler, courtesy of Cornell University)

Injury

Tick feeding often results in inflammation, swelling, irritation, and the potential for secondary bacterial infection at the feeding site. When dogs are heavily infested, excessive blood loss can result in death.

The risk of infection by tick-borne disease agents is of primary concern. Humans and dogs can become infected with causal agents of Rocky Mountain spotted fever, Lyme disease, ehrlichiosis, tularemia, and babesiosis among others. **If you experience fever or flu-like symptoms following a tick bite, immediately contact your physician.** It is important to receive the appropriate antibiotics as soon as possible.

Dogs that become infected with a tick-borne disease may become lethargic and anemic; they may quit eating and lose weight; in some cases, they may become lame. A dog with such symptoms should be examined by a veterinarian.

Rocky Mountain Spotted Fever

American dog ticks are the primary transmitter of Rocky Mountain spotted fever, which is one of the most common tick-transmitted diseases in Ohio. Symptoms of Rocky Mountain spotted fever appear 3 to 12 days after tick feeding and typically include sudden high fever, headache, and aching muscles. On the second or third day of the fever, a non-itchy rash may develop on the wrists and ankles. The rash soon spreads to other parts of the body including the torso, palms, and soles. This disease rapidly progresses and can cause death if not treated with the appropriate antibiotics. Most fatalities can be attributed to a delay in seeking medical attention. Early treatment of spotted fever typically results in rapid recovery.

Lyme Disease

Lyme disease is the most prevalent tick-borne disease of humans in the United States with approximately 10,000 cases reported annually. This bacterial disease is named after Lyme, Connecticut, where cases were first reported in 1975. The nymphal stage of the blacklegged tick is usually responsible for transmitting Lyme disease to humans.

Blacklegged ticks are very rare in Ohio, and the Lyme disease bacterium, *Borrelia burgdorferi*, has never been isolated or identified from any animals or ticks in the state. Nevertheless, 40 to 80 cases of Lyme disease occur annually in Ohio. Some of these cases can be tracked as being acquired out-of-state. However, it is possible that infected nymphs are transported on migratory birds, or blacklegged tick populations may be too low to be detected via current surveillance efforts, although many hundreds of animals have been tested in Ohio.

Be alert for a red, ring-like rash developing at the site of a tick bite within 2 to 32 days, because this ring-rash is diagnostic for Lyme disease. Note, however, that ~40% of infected humans do not develop a ring-rash. Fever, head-

ache, fatigue, or joint pain also may be symptoms of Lyme disease. Immediate antibiotic therapy for Lyme disease reduces the risk of neurological, arthritic, or cardiac complications developing days to years later.

Identification and Disease Testing of Ticks

A FREE service for identification and disease testing of ticks is provided by:

The Ohio Department of Health
Zoonotic Disease Program
8955 E. Main St.
Reynoldsburg, OH 43068
Telephone: 614-752-1029
Fax: 614-644-1057

- Ticks can be identified whether dead or alive, but only live ticks can be tested for disease.
- Place the live tick in a small, tightly sealed container (pill bottle, film container, etc.) or zippered plastic bag, along with a few blades of green grass to provide moisture.
- Store the tick in a cool place until it can be mailed to the above address.
- Prompt mailing of the tick is best. Include a note with the collection date and the county where the tick was found. Indicate whether it was attached to a human or companion animal.
- Contact the Ohio Department of Health's Zoonotic Disease Program (see above) if you have any questions about ticks and testing available.

Integrated Pest Management Strategies

Prevention and Personal Protection

- Avoid tall grass and weedy areas during tick season, April through August.
- If exposure to a tick-infested area is unavoidable, tuck pants into socks or boots. Or use masking tape to wrap the bottom of the pant leg around the top of boots or shoes. Such measures provide a physical barrier and crawling ticks can be more easily detected.
- Wear light-colored clothing to make it easier to find crawling ticks.
- Apply a tick repellent containing DEET or permethrin to the socks and pant legs when going into tick habitat. Do not apply permethrin directly to exposed skin.

- Keep dogs confined to your yard or home; do not allow them to roam freely.
- Keep dogs on a leash and inspect them for ticks after a walk. Dogs can become infected with tick-borne diseases.

—Tick Checks and Tick Removal

- Inspect for ticks periodically (every hour or so if in tick habitat and as soon as you leave their habitat) to remove them before they attach and begin feeding. Ticks can be found crawling on clothing and bare skin before attachment. Be sure to also inspect children and companion animals.
- Pay special attention to the head and back of the neck of humans to detect attached ticks.
- PROMPTLY REMOVE any ticks. Prompt removal of an attached tick reduces the chance of infection by Rocky Mountain spotted fever or Lyme disease. Tick attachment of several hours or more often is required for disease transmission.
- Take care not to crush or puncture the tick during removal. Rocky Mountain spotted fever may be acquired from infected tick body fluids that contact broken skin, the mouth, or eyes. Do NOT use a hot match or cigarette to remove a tick as this may cause the tick to burst.
- Do NOT apply solvents or other materials to the tick to “stimulate” the tick to detach. Such treatments can result in increased tick salivation and disease transmission.
- Avoid touching a tick with bare hands. Shield your fingers with a paper towel, wear rubber gloves, or use tweezers.
- Grasp an embedded tick as close to your skin as possible (the area where the tick's mouthparts enter the skin) and use steady pressure to pull it straight out. Do not twist or jerk the tick, as its mouthparts may be left in the skin.
- After tick removal, thoroughly disinfect the bite site and wash your hands with soap and water. The feeding lesion should be swabbed with a topical antiseptic to prevent secondary bacterial infection.
- As soon as possible, send the live tick for disease testing (see above for information regarding this free service provided by the Ohio Department of Health's Zoonotic Disease Program).

Habitat Modification

Habitat management is essential for controlling tick populations. Keep your yard mowed and do not allow brush or leaf litter to accumulate. Tall weeds or grass should be mowed and brush removed to eliminate the habitat of tick hosts, such as the white-footed mouse, meadow voles, and other small mammals.

Host Removal

It is helpful to remove rodents harboring inside or near one's house by using traps or rodenticides.

Pesticides

As mentioned above, products containing DEET or permethrin applied to the socks and pant legs are useful for repelling ticks if you are unable to avoid a tick-infested area.

Dogs may be treated for ticks, and products are available from your veterinarian. Before using any over-the-counter product, it is recommended that you consult your veterinarian.

In areas where it is necessary to control ticks in the rodent population, open tubes packed with insecticide-treated cotton and placed at an appropriate density in the landscape can be used. Ticks die after contacting treated cotton that has been incorporated into rodent nests.

Outdoor chemical control is largely ineffective because

of the wide distribution and movement of most tick species. The brown dog tick is an exception because of its close proximity to human habitation. Treatment of the premises outside the home should include grassy and brushy areas around outbuildings and kennels, sites where the dog rests, and underneath doghouses where ticks may reside during off-host periods.

Pesticide treatments should be preceded by sanitation efforts such as vacuuming and cleaning to remove debris and as many ticks as possible; this also allows increased penetration of an insecticide into cracks and crevices. Pesticide application indoors should target areas frequented by the dog, particularly its sleeping and resting sites where ticks are likely to have dropped off. Because ticks hide in secluded places to molt, it also is critical to treat cracks and crevices in the floor and walls, baseboards, window frames, and doorframes; around wall molding and hangings; and under carpet edges.

The dog should be treated for ticks, preferably by a veterinarian, at the same time as the premises, outdoors or indoors, are being treated. A variety of pesticide products are labeled for indoor and outdoor treatment of ticks. For a list of products available for use by homeowners or by commercial pesticide applicators, see <http://edis.ifas.ufl.edu/IG088> [P. G. Koehler and F. M. Oi (2003), Ticks, University of Florida Extension, ENY-206].

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