Ticks and their control
Jeff Hahn, Entomology

There are thirteen known species of ticks in Minnesota. The majority of these species are known as hard ticks, i.e. they have a relatively hard body and possess a plate-like shield, or scutum (Figure 1), behind the head. Of these, three kinds are commonly encountered by humans: American dog tick, also called wood tick, blacklegged tick, formerly called deer tick, and brown dog tick.

Jeff Hahn, University of Minnesota
Figure 1. Scutum of typical (blacklegged) ticks, female (left) and male (right).

Occasionally, people may encounter soft ticks (Figure 2) which have a more leathery body and lack a scutum behind the head. When looking at a soft tick from above, the head is typically hidden from view. In homes, soft ticks are usually associated with bats.

Identification
Ticks can be very challenging to identify. Color is sometimes helpful in distinguishing tick species but you can not rely on this in all situations. While there are differences in size between ticks, size is also not a reliable method as there is much overlap between species, especially when immature and adult ticks are encountered. Also remember that adult males are smaller compared to females. Engorged ticks are particularly challenging to identify as their size and color are greatly altered. You can distinguish between females and males in the adult stage as females possess a relatively small scutum while this plate-like structure in males covers most of their body (Figure 1). If there is ever any doubt as to what species of tick you have encountered, submit it to an expert for identification.

Importance
Ticks are considered to be a pest because some species bite people and feed on blood. They can also feed on dogs, other pets and livestock. These ticks cut a small hole in the skin and insert their mouthparts into the opening, thus attaching themselves to their host. Some ticks will even secrete a substance to further cement the mouthparts to the skin. There is a superstition that says that ticks twist their mouthparts into the bite wound and have to be "unscrewed" to be removed. However, this is not true.

Blacklegged ticks (formerly known as deer ticks) can potentially transmit the disease organisms that cause Lyme disease, human anaplasmosis (formerly known as human granulocytic ehrlichiosis), babesiosis, and Powassan encephalitis. Although American dog ticks are known to carry the disease organism that causes Rocky Mountain spotted fever in the U.S., this disease is rarely encountered in Minnesota. For more information see Tick-Borne Diseases in Minnesota.

Life cycle
A generalized tick life cycle consists of egg, larva, nymph, and adult. The immature larva and nymph stages are very similar in form to the adult, but are smaller and often different in color. A larva has six legs, while nymphs and adults have eight legs. The tick feeds once in each stage before maturing to the next stage (some soft ticks can feed more than once as a nymph).

Centers for Disease Control and Prevention
Figure 3. Blacklegged tick life cycle

Hard ticks typically go through their life cycle feeding on three different hosts (Figure 3) (although sometimes it may be just one or two hosts). Depending on the moisture tolerance and host preference of a given tick species, they may be found in grass, shrubs, brush, and other vegetation, particularly along animal trails or footpaths. They typically quest, i.e. search, for hosts by climbing up plants and sticking their legs out when they detect a potential host (i.e. they detect CO2, body heat, biochemical cues). When a moving body brushes against them, they quickly let loose of the plant on which they are resting and attach to the animal or human. The superstition that these ticks crawl up trees and drop down on humans and animals is not true. They are infrequently found in short, maintained lawns. Hard ticks typically remain attached to their hosts for days at a time.

Soft ticks are typically found around animal burrows and dens, bat caves, and homes, especially attics where bats roost. Compared to hard ticks, they do not attach themselves firmly to hosts and feed more frequently but for much shorter periods of time.

American dog tick
*Dermacentor variabilis*

American dog tick adults are dark brown with whitish or yellowish markings (Figure 4). They are most commonly encountered in spring in open fields and the underbrush of hardwood forests, but are active throughout summer. They feed on a wide variety of mammals, including white-footed mice, voles, chipmunks, raccoons, squirrels, dogs, cats, and people.

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Figure 4. American dog ticks, female (left) and male (right)

These ticks usually take two years to complete their life cycle. During the summer of the first year, the eggs hatch into larvae. These larvae do not feed until late spring or early summer the following year. After their blood meal, they turn into nymphs. After feeding a second time, these immature ticks develop into adults during late summer of the second year. The adults do not feed until the following spring, when the weather turns warm. Adults are common April through June but die after laying eggs, thus completing the life cycle.

Blacklegged tick (formerly deer tick)
*Ixodes scapularis*
Female blacklegged tick adults are reddish brown with a black head, legs, and scutum (the plate-like structure behind the head) (Figure 1, 5, 6). The primary hosts of blacklegged ticks are white-footed mice and white-tailed deer, although they also feed on other mammals, birds, and humans.

Blacklegged ticks require at least two years to complete their life cycle (Figure 3). Larvae begin to hatch in June and feed throughout the summer on white-footed mice or other small mammals or ground-foraging birds. They usually spend the winter as nymphs. The following year the nymphs take blood meals in spring or early summer, feeding on small mammals, birds, or humans. They usually turn into adults in late summer. Adults take blood meals in the fall or the following spring. They feed on white-tailed deer, dogs, horses, raccoons, or humans. Females die after laying eggs in late spring, completing the life cycle.

Jim Occi, BugPics, Bugwood.org
Figure 5. Blacklegged tick adults and nymphs

The blacklegged tick is important because it is a potential carrier of the Lyme disease spirochete Borrelia burgdorferi. In Minnesota, the highest risk of Lyme disease occurs in the southeast, east central and north central areas of the state. Most cases of Lyme disease occur in June and July due to bites from infected nymphal ticks, although cases have been reported in Minnesota from February through November.

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Figure 6. Blacklegged ticks, female (left) and male (right)

A person bitten by a Lyme disease-infected tick usually develops a red skin lesion (assuming the tick has fed long enough to transmit the spirochetes, about 1 – 2 days). The lesion expands over a period of days to form a large bright red ring with a clear center. Sometimes the red rash does not have this central clearing. It may or may not be hot or itchy. Other symptoms at the onset may include malaise, fatigue, chills, fever, headache, muscle pain, or sore throat. Several days to months later, arthritis can develop which involves swelling of the joints, especially large joints, such as the knees. Cardiac abnormalities and nervous system problems may also occur. See a doctor immediately if you believe you have been bitten by a tick carrying the Lyme disease agent. Correct identification of the tick may aid your doctor in Lyme disease diagnosis.

Blacklegged ticks can also vector agents of human anaplasmosis (formerly known as human granulocytic ehrlichiosis), babesiosis, and Powassan encephalitis. These diseases are potentially severe illnesses that often begin with "flu-like" symptoms of fever and muscle aches. For more information, see Tick-Borne Diseases in Minnesota.

Brown dog tick

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Figure 7. Brown dog ticks, female (left) and male (right)
*Rhipicephalus sanguineus*
Brown dog ticks are brown, lacking any markings on their bodies (Figure 7). Dogs are the primary host for this tick. Brown dog ticks cannot survive winters outdoors in Minnesota but can be associated with dogs year-round in heated kennels and homes. They are most active from spring through fall. Female ticks can lay up to 3,000 eggs under baseboards, behind radiators, or in floor spaces. Within three weeks to two months, the larvae hatch and crawl around in search of a dog for a blood meal. They may be found on carpeting, furniture, draperies, and walls and can become annoying. As they develop they will eventually take a second and third blood meal before becoming an adult. After mating, females lay a single batch of eggs, and then die.

Bat tick
*Carios* (formerly *Ornithodoros*) kelleyi
A bat tick, a type of soft tick, is brownish-gray or dirty gray in color with a granulated, i.e. warty, looking body (Figure 2). It is found in homes where bats roost in the upper floors of the buildings. Other soft-bodied ticks are associated with birds and poultry. In the absence of their normal hosts, these ticks may wander into parts of homes inhabited by people. While they can bite humans, this does not appear to be common. Fortunately, they are unable to reproduce on human blood and do not survive for long without their hosts.

Removing an attached tick
Prompt removal of embedded ticks is important as the risk of disease transmission increases the longer ticks are attached and biting. The best method for removing a feeding tick attached to an animal or human (the host) is to grasp it as close as possible to the skin of the host with tweezers or tissue paper. Be careful to avoid squeezing the abdomen. Gently, yet firmly apply steady pressure on the tick until you pull it out. If you try to jerk or twist the tick out, you risk the mouthparts breaking off and remaining in the skin. Always clean out the wound with a good germicidal agent, such as iodine, to help prevent infection.

The use of tape, alcohol, or Vaseline to cover the tick and cause it to voluntarily pull its mouthparts out of the skin is not effective; ticks are unaffected by these methods. If there is any question as to whether this tick is a species that can potentially transmit disease, save it by placing it in a small container to be identified later.

Prevention and control measures
American dog tick and blacklegged tick
Personal protection

Ticks usually crawl onto people below the knees and then crawl upwards. When you are outdoors in known tick areas, wear protective clothing, such as long-sleeved shirts and long pants. Wear light colored clothes so it is easier to see ticks on you. For added protection, tuck pants inside socks. This helps keep them on the outside of your clothing, giving you more time to see and remove them before they get to your skin and start feeding.

Stay on trails and avoid walking through woody, brushy, or grassy areas where ticks are most common.

Use repellents for additional protection. Apply them to socks, pant legs, and parts of clothing that may brush against vegetation.

DEET (N, N-diethyl-m-toluamide) and permethrin are effective repellents. You can apply DEET to clothing and skin, 20% - 30 % DEET protects for several hours. Although higher concentrations of DEET are available, there is evidence that suggests that there may not be much added protection with higher concentrations. Apply permethrin only to clothing. Permethrin-based repellents remain effective for several wearings. Do not overapply repellents; apply only enough to cover the desired area.

Check your clothes and yourself when you have been outdoors in known tick areas. Particularly examine yourself around the waist, under the arms, inner legs, behind the knees, and around the head, including in and around the ears and in the hair. Adults should help check their young children for ticks. Save any suspected blacklegged ticks for identification.

In your yard
The numbers of ticks that are found on a property are influenced by the amount of favorable habitat that is found there, i.e. brushy, grassy areas, and the number of animals, especially whitetailed deer and whitefooted mice, that are present.
You can reduce tick numbers through landscape modification that creates a less favorable environment for ticks and their animal hosts.

Keep grass and vegetation short around homes, where it borders lawns, along paths, and in areas where people may contact ticks. Ticks are less likely to survive in short grass.

Remove leaf litter and brush, especially from buffer areas, i.e. where the lawn borders grassy, brushy areas. Also prune trees and shrubs in these areas to allow more sunlight through as ticks are more common in shaded areas.

You may be able to reduce the number of ticks adjacent to your home by reducing the number of deer that are nearby, although this usually very challenging. Do not encourage deer into your yard by feeding them. Fences can help reduce the number of deer that enter into your yard, but will have to be sufficiently high enough, about 8 â€” 10 feet tall. Try to avoid plants that deer particularly like to eat. For more information, see Coping With Deer in the Landscape.

It is generally not effective to treat large areas of woods, brush, or grass with insecticides as insecticides do not always reach into areas where ticks are found (e.g. in the leaf litter). Ticks can also be reintroduced into areas when animals and birds carrying ticks move into previously treated areas.

It is not necessary to treat your lawn for ticks as ticks rarely infest maintained yards.

In cases where high numbers of ticks are present in areas adjacent to home yards, treating the edges of wooded or brushy areas and paths can help to reduce tick numbers. Use an insecticide labeled for a turf area, such as those containing permethrin, cyfluthrin, or carbaryl. Do not spray such an area more than once a year.

Protecting dogs
There are a variety of products that you can use to protect dogs from ticks which fall into one of the following categories: spot on treatments, repellents, sprays, dips, and impregnated collars. The most effective active ingredients are fipronil (spot-on formulations and sprays), amitraz (spot-on formulations and impregnated collars), and permethrin (spot-on formulations and sprays).

Several vaccines are available to protect dogs against Lyme disease. Consult your veterinarian about the advisability or necessity for vaccinating your dog.

Examine your dog for ticks after it has been outdoors. Examine the fur as well as possible. Also be sure to check in and around the head, neck and ears. Remove ticks as outlined above.

Brown dog ticks
Control begins with treating dogs for ticks (see above).

If an infestation of brown dog ticks is identified, it is also important to treat the premises with a residual indoor insecticide. Common active ingredients include permethrin, bifenthrin, lambda cyhalothrin, tralomethrin. Immature and adult ticks can move considerable distances indoors and are commonly found on the floor, around baseboards, carpeting, rugs, and similar sites as well as higher up on walls, window and door casings. Spray these, and other areas, where ticks are found.

Bat ticks
To control bat ticks, it is first necessary to eliminate the bats from the building. As long as they remain, they are a reservoir for additional bat ticks. The best method for permanently ridding a building of bats is to exclude them. This requires that all of their entrances are identified and then sealed after all of the bats have left. The best time to do this is late summer and fall. For more information, see Bats in Houses.

If it is necessary to treat bat ticks, concentrate insecticide sprays where the bats were roosting as well as in cracks and crevices in other sites where the ticks are hiding. Use a residual insecticide labeled for indoor use,
such as permethrin, bifenthrin, lambda cyhalothrin, tralomethrin. You can also consider hiring a pest control service for this job.

Caution: Always read pesticide labels carefully before buying and again before using these products. The label on the product you are using is the final authority on how you may legally use the pesticide.

Thanks Stop Back Soon!

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