

# Colorado Ticks and Tick-Borne Diseases

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Insect Series | Trees and Shrubs



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Ticks are blood-feeding parasites of animals found throughout Colorado. They are particularly common at higher elevations. Problems related to blood loss do occur among wildlife and livestock, but they are rare.

Ticks are most important because they can transmit diseases such as Colorado tick fever, Rocky Mountain spotted fever, tularemia and relapsing fever. Lyme disease is an important tick-borne disease in much of the eastern United States. Fortunately, ticks known to transmit it are not known to occur in Colorado, and no confirmed cases have originated in the state.

Some 30 species of ticks occur in Colorado. Table 1 lists the more common ones. Hard-shelled ticks (Ixodidae family) predominate and are represented by such familiar species as the Rocky Mountain wood tick, American dog tick and brown dog tick. Hard-shelled ticks have a distinctive plate on the back just behind the head. At each stage of development, the tick attaches itself to a host, feeds for several days, becomes extremely bloated, then drops off the host.

Soft ticks (Argasidae family) are much less commonly encountered. They usually are found in the nests of their animal hosts. They tend to feed intermittently but repeatedly, for only a few hours at a time. One exception is the spinose ear tick, rare in Colorado, that feeds for several months while attached to a large mammal host.

## Life Cycle of Ticks

Almost all human encounters with ticks involve either the Rocky Mountain wood tick or the closely related American dog tick. They have a typical life cycle that involves four distinct stages: egg, tiny six-legged larva or seed tick, nymph and adult.



Figure 1: Adult ticks, engorged adult at left.



Figure 2: Adult Rocky Mountain wood tick. Photograph courtesy of Oregon State University.

Rocky Mountain wood ticks and American dog ticks are typical of a **three-host tick**. During each feeding stage (larva, nymph and adult), the tick must find and feed on a different animal, because the tick drops from the host after the blood meal. Females lay their eggs on the ground. The newly hatched larvae seek a small mammal, such as a rodent, as the first host. After feeding, they drop to the ground and molt to the nymph stage. The nymph then seeks its own small mammal host. After feeding this second time, the nymph drops from the animal and molts to the adult stage. Adult Rocky Mountain wood ticks and American

## Quick Facts

- In Colorado, Rocky Mountain wood tick and American dog tick are the most common ticks associated with people.
- Colorado tick fever is by far the most common tick-transmitted disease of the region. Despite its name, Rocky Mountain spotted fever is quite rare here.
- No human cases of Lyme disease have originated in Colorado.
- DEET is the most effective tick repellent. Apply it to pants or other areas of the lower body.
- To remove a tick, grasp it with blunt tweezers, as close to the skin as possible.
- The Rocky Mountain wood tick is relatively easy to remove because it has fairly short mouthparts.

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After walking through areas where ticks might be present, conduct a tick check to find and remove any ticks you may have picked up.

dog ticks then feed on a large mammal host, such as a dog or deer. After this feeding, the adults drop off the host and mate, and the females lay eggs. It is the adults that occasionally feed on people.

Ticks are highly sensitive to carbon dioxide, which is exhaled by animals as they breathe, and seek it out. They often are poised at the top of vegetation so they can readily cling to passing animals.

A complete life cycle for these and other multihost ticks may take from a few months to several years to complete. Its length is mostly determined by how successful they are in locating new hosts. They are highly resistant to starvation and, if necessary, can survive several years without feeding. The common species are most active in late spring and early summer. If the tick has not found a host by the time that hot summer temperatures arrive, it seeks cover under leaves and remains dormant until the next year. Peak periods of tick activity can begin as early as March during warm seasons. They usually subside by mid-July.

A multihost tick with a somewhat different life history is the **brown dog tick**. This tick can breed continuously indoors and may feed repeatedly on a single (dog) host during each of the three development stages.

## Avoiding Ticks

### Avoid Tick Habitat

Avoid traveling through areas where ticks are abundant. Ticks are most active in spring and early summer and concentrate where their animal hosts most commonly travel. This includes brushy areas along the edges of fields and woodlands or commonly traveled paths through grassy areas and shrublands.

### Use Tick Repellents

There are a few effective tick repellents. By far the most common is **DEET** (N,N-diethyl-metatuamide), the active ingredient in most common insect repellents, such as Cutters and Off!. Apply DEET directly to the skin or to clothing. Repellents are most effective if applied to

pants and other areas of the lower body likely to come into contact with ticks.

DEET can be an effective repellent for ticks as well as other biting arthropods, such as chiggers and mosquitoes. However, the following precautions are encouraged:

1. On children, do not use high concentration formulations (above 30 percent).
2. Apply the repellent to clothing, rather than to skin.
3. Do not apply DEET to hands or other areas that may come into contact with the mouth.
4. Do not apply to wounds or irritated skin.
5. After use, wash or bathe treated areas, particularly on children.

**Permethrin** (Permanone) is a new tick product. Apply it only to clothing, not to skin. It can kill ticks rapidly. Permanone also may have some repellent activity against ticks.

### Wear Protective Clothing

Long pants, long-sleeved shirts and other clothing can help exclude ticks or keep them from attaching to the skin. Ticks are usually acquired while brushing against low vegetation, so pulling socks over the bottom of the pants leg also is useful. Light-colored clothing can make it easier to find ticks that have been picked up.

### Conduct Tick Checks

Ticks take several hours to settle and begin feeding. This gives you ample time to detect and remove them. The Rocky Mountain wood tick typically takes 12 to 24 hours to start feeding. Therefore, a thorough "tick check" can be an effective alternative to repellents. After walking through areas where ticks might be present, carefully look for and remove any ticks you may have picked up.

## Controlling Brown Dog Ticks in a Home

Unlike the more common ticks (American dog tick, Rocky Mountain wood tick), the brown dog tick spends most of its life around the dog host. It is a subtropical species that cannot survive outdoors year-round in Colorado. Infestations most often develop in protected areas, such as kennels. After they have taken a blood meal, adult ticks may crawl up walls and lay eggs in cracks and corners of the room.

Treatment of the dog is essential, using one of the many flea and tick powders, dips or collars. However, areas that the dog frequents, such as bedding and resting areas, also need to be treated to kill residual ticks. Vacuum cracks along baseboards where ticks may hide and spot treat these areas with insecticide. Discard the vacuum bag and contents after treatment.

If possible, wash bedding and all other materials. Because these ticks are sensitive to cold, storing infested items outdoors during very cold temperatures also can kill these ticks. It may take several weeks and multiple treatments to eliminate brown dog ticks.

## How to Remove a Tick

Once a tick has become firmly attached to the skin, removal can be difficult and should be done with care. The mouthparts are barbed, so they may remain after removal and allow infection. Fortunately, the Rocky Mountain wood tick, the most common species found in Colorado, is relatively easy to remove because it has fairly short mouthparts. The recommended procedure for removal of ticks is:

1. Grasp the tick with blunt tweezers, as close to the skin as possible. If tweezers are not available and you must use your fingers, cover them with tissue or thin plastic to avoid the possible transmission of any disease organisms, such as tularemia, that the tick may harbor.
2. Pull the tick slowly and steadily, straight away from the skin. Try not to crush the tick as you remove it.
3. After the tick is removed, treat the feeding site with a disinfectant. Wash your hands when done.

Many other methods have been popularized to remove ticks, such as covering them with petroleum jelly or touching them with a hot match. These methods are not effective.

A rare but potentially serious condition from tick feeding is **tick paralysis**. This occurs when certain ticks (in Colorado, particularly the Rocky Mountain wood tick) remain attached for a long period and produce an ascending paralysis. Early symptoms, such as difficulty walking, progress to more generalized symptoms, such as limb numbness and difficulty breathing. This condition is completely reversible when the tick is removed.

**Table 1. Common ticks found in Colorado.**

Scientific name (common name)	Hosts
<i>Dermacentor albipictus</i> (winter tick)	Deer, elk and large domestic animals.
<i>D. andersoni</i> (Rocky Mountain wood tick)	Small rodents, porcupines, deer and large domestic animals. Most common species that bites people.
<i>D. parumapertus</i>	Primarily jack rabbits.
<i>D. variabilis</i> (American dog tick)	Small rodents, dogs, raccoons and other animals. Occasionally feeds on people.
<i>Haemaphysalis leporis-palustris</i> (rabbit tick)	Rabbits, jack rabbits.
<i>Ixodes cookei</i>	Wide variety of rodents and carnivores. Occasionally feeds on people.
<i>I. kingi</i>	Prairie dogs and associated animals.
<i>I. sculptus</i>	Burrowing rodents, such as ground squirrels, and their predators.
<i>I. spinipalpis</i>	Rabbits, wood rats and <i>Peromyscus</i> mice.
<i>I. texanus</i>	Weasels and martens.
<i>Ornithodoros hermsi</i>	Chipmunks, rock squirrels and other rodents.
<i>Rhipicephalus sanguineus</i> (brown dog tick)	Dogs. Infrequently feeds on people. Sometimes reproduces within the home.

**Table 2. Tick-borne diseases in Colorado.**

Disease/ causal organism	Incidence in Colorado	Symptoms	Tick vectors
Colorado tick fever/ biphasic fever (a virus)	The most common disease transmitted by ticks. About 200 cases per year are reported, but it is suspected that this disease is largely underreported.	Generally flu-like, including aching, fever, chills and fatigue. This typically lasts for 1 to 3 days. More severe complications sometimes develop.	Rocky Mountain wood tick, American dog tick.
Lyme disease (a bacterium, <i>Borellia burgdorferi</i> )	No confirmed infections in people have originated in Colorado.	A characteristic ring-like rash develops at the feeding site. Aching, headache and flu-like symptoms are typical early. Serious complications sometimes develop, including numbness and/or partial paralysis, severe headaches, fatigue, and effects on joints (arthritis), heart or nervous system.	Black-legged tick ( <i>Ixodes scapularis</i> ). Ticks confirmed to transmit Lyme disease to people are not known to occur in Colorado. It is transmitted by <i>I. spinipalpis</i> to rodents.
Relapsing fever/ borreliosis (a bacterium, <i>Borrelia hermsii</i> )	Very rare.	Rapidly developing fever 3 to 10 days after initial infection. Fever declines after about 4 days but may recur in multiple cycles.	Soft ticks of the genus <i>Ornithodoros</i> that are associated with rodents (e.g., chipmunks, pine squirrels). Human infections typically occur when camping in rustic cabins inhabited by infected rodents.
Rocky Mountain spotted fever (a bacterium, <i>Rickettsia rickettsii</i> )	Rare, much more common in some areas along the Atlantic coast. About 3 cases per year, on average, are reported in Colorado. Historically, most cases have occurred in northwestern Colorado.	Initially, a general feeling of malaise and/or aches. A characteristic rash develops, starting on the wrists and ankles and later spreading to the rest of the body, including palms and the soles of feet. High fever is associated with infections.	Rocky Mountain wood tick, American dog tick.
Tick paralysis	Rare. Occurs when certain ticks remain attached for a long period.	Early symptoms (e.g., difficulty walking) progress to more generalized symptoms (e.g., limb numbness, difficulty breathing). This condition is completely reversible when the tick is removed.	Rocky Mountain wood tick.
Tularemia (a bacterium, <i>Francisella tularensis</i> )	Very rare in people but can be widespread in wild animals, particularly rabbits.	Sudden high fever, general weakness and swelling/pain of the lymph nodes.	Rocky Mountain wood tick, American dog tick. Most human infections occur from contact with the blood of infected animals (e.g., while skinning rabbits).



**Figure 3:** Soft tick.

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