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Controlling Ticks

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Identification and control of ticks common to Nebraska.

Ticks are members of the same phylum (Arthropoda) of the animal kingdom as insects but are in a different class (Arachnida). The main difference is the body of a tick is composed of only two sections while insect bodies have three sections.

There are over 800 species of ticks, 100 of which are important to man and animals because of economic losses or disease transmission. Fortunately in the United States, only about 12 species are economically important because they transmit disease organisms (viral, bacterial, protozoan, and rickettsial) or cause economic losses to livestock.

In Nebraska only three tick species, *Dermacentor andersoni* (Rocky Mountain wood tick, *Figure 1*), *Dermacentor variabilis* (American dog tick, *Figure 2*), and *Rhipicephalus sanquineus* (brown dog tick, *Figure 3*), are found in enough numbers to be considered economically important. *Amblyomma americanum* (lone star tick) and *Dermacentor albipictus* (winter tick) are occasionally found in southeastern and western Nebraska, respectively. The "spinose" ear tick, *Otobius megnini*, also may be found in western Nebraska.

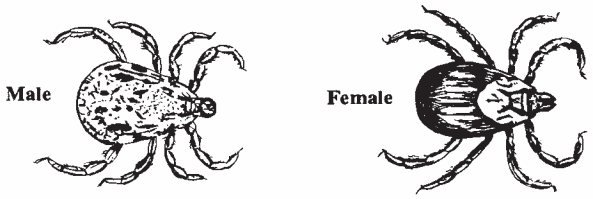

Figure 1. Male (left) and female Rocky Mountain wood tick, *Dermacentor andersoni.*

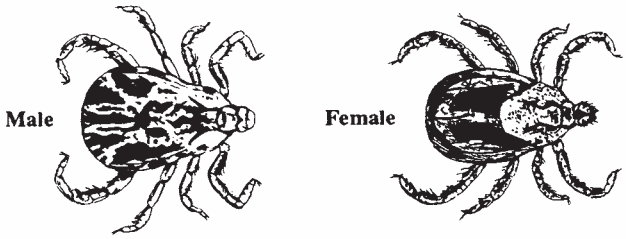

Figure 2. Male (left) and female American dog tick, *Dermacentor variabilis.*

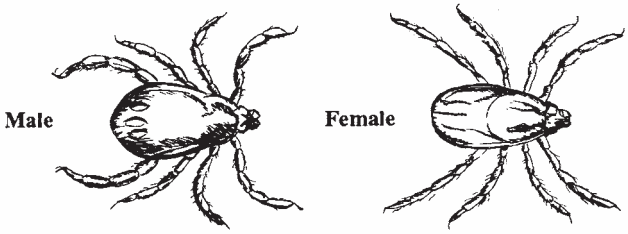

Figure 3. Male (left and female brown dog tick, *Rhipicephalus sanguineus.*

Classification

The ticks found in the United States are divided taxonomically into two main families — the hard ticks (Ixodidae) and soft ticks (Argasidae). The hard ticks are flattened dorsoventrally in the unfed state, possess a marginal outline which tapers toward the anterior, and the mouthparts are clearly visible. In the adult stage, a sclerotized dorsal plate (scutum) is evident and this is often ornate with patterns in white or gold against a brown or gray background. The soft ticks have an oval or pear-shaped outline with the anterior body region broadly rounded. The mouthparts are difficult to see from a dorsal view. The soft ticks are inornate and have a granulated leathery appearance.

Adult ticks can usually be identified by comparing them with illustrations or photographs. Tick larvae and nymphs are difficult to identify, and are best identified by specialists in tick taxonomy. Ticks also are classified on the basis of life cycle as one-, two-, or three-host ticks. Tick species found in the United States are generally one- or three-host ticks. Most tick species feed on blood three times during their life cycle. One-host ticks remain attached to the host during all three blood-feeding times. The three-host ticks feed, drop off, and reattach later to progressively larger hosts. Examples include the winter tick, a one-host tick, and the lone star tick, a three-host tick.

General Biology

Tick life cycles include four stages: egg, six-legged larva, eight-legged nymph, and adult. The soft ticks may pass through two to seven nymphal instars dependent on species and environmental conditions. Soft ticks generally complete feeding in a short time and the hard ticks require long feeding periods. Engorged female ticks deposit large numbers of eggs either in one batch or several smaller batches and, when the egg-laying function is completed, die. The eggs hatch into small six-legged larvae (seed ticks). The seed ticks crawl up on vegetation and, as a host animal passes, attach to an animal. Once attached, the seed tick feeds on blood and either remains on the animal (one-host tick) or drops off to reattach later as a nymph. The survival rate for seed ticks, nymphs, and even adult ticks is low because of the environment and the chance of not finding a host, but this is offset by the great number of eggs deposited by a female and the ability of immature and adult ticks to survive long periods without feeding.

Economics of Tick Infestations

The Rocky Mountain wood tick is a three-host species. Adult ticks appear in the spring. They climb on low vegetation along animal trails in pasture or forested areas and attach to passing animals (usually cattle or horses).

When feeding, the tick uses its chelicerae (teeth) to cut an entrance in the victim's skin and then inserts its mouthpart. The hypostome (feeding tube) has many rows of recurved barbs that anchor the tick to its host. Blood is pumped by a muscular pharynx (pump) and the salivary glands produce an anticoagulant that allows long periods of feeding without the host blood coagulating.

The Rocky Mountain wood tick mates during feeding. After feeding, the female detaches from the host and deposits several thousand eggs over a month. Hatched seed ticks attach to small rodents, feed, detach and develop into the nymphal stage. Nymphs seek shelter and are inactive until the following spring. In the spring, the nymphs attach to another animal, feed and drop off where they molt into the adult stage. The adult stage overwinters and the following spring they attach to a large animal, feed and start the life cycle over with the whole procedure requiring three to four years.

Rocky Mountain wood tick is a vector of bovine anaplasmosis and canine babesiosis (blood parasites of animals), and the toxins injected as it feeds cause tick paralysis. Hides punctured by tick feeding are down-graded because of reduced tinsel strength. This tick is also a vector of Rocky Mountain spotted fever, a rickettsial disease of man.

Dermacentor variabilis, the American dog tick, has a life cycle similar to its close relative, the Rocky Mountain wood tick. This species is the most important vector of Rocky Mountain spotted fever in the United States. Experimentally, the species has also been implicated in the transmission of anaplasmosis.

The brown dog tick, *Rhipicephalus sanquineus*, is found worldwide in temperate climates. Although it is a three-host tick, its hosts are almost exclusively dogs. It remains close to areas frequented by dogs, including kennels, sheds, barns and other buildings. Nymphs often congregate at the bottom of building walls. This tick can complete its life cycle in about two months, so there may be multiple generations. It is a vector of canine babesiosis, canine ehrlichiosis, and probably *Salmonella entoritches*.

The lone star tick, *Amblyomma americanum (Figure 4),* is also a three-host tick. Larvae and nymphs are found on small animals or birds. Adults usually parasitize larger animals such as deer, cattle, or horses. It is generally found only in the southeast corner of Nebraska and is rare even there.

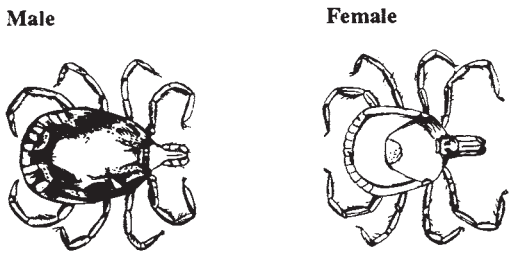

Figure 4. Male (left) and female lone star tick, *Amblyomma americanum.*

The winter tick, *Dermacentor albipictus (Figure 5)*, is a one-host tick found most often on cattle, horses, and deer. Occasionally it is reported in western Nebraska, usually on horses or cattle that originated in Colorado or Wyoming. Its habitat is generally upland meadows or woods in mountainous areas. This tick attaches to the host animal as a seed tick and remains attached throughout its life. The ticks are generally found on animals only during winter.

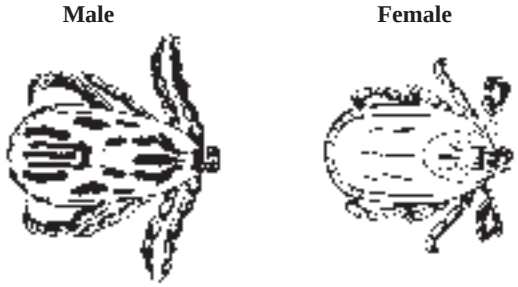

Figure 5. Male (left) and female winter tick, *Dermacentor albipictus.*

The "spinose" ear tick, *Otobius megnini (Figure 6)*, is a soft, one-host tick. The nymph has spines on the body, hence the name. The adult tick does not feed and may live in and around corrals, barns and cattle loafing areas for a year or more waiting to mate. After mating, the females deposit eggs in batches for up to six months.

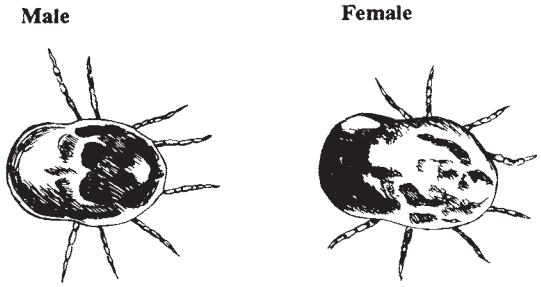

Figure 6. Male (left) and female "spinose" ear tick, *Orobius megnini.*

Larvae crawl up on vegetation, and after finding a host, move to the animal's ear. Both the larvae and nymphs feed in the ear which, because of irritation and secondary infections, causes a condition called "canker ear". Although cattle are the primary host, this tick parasitizes many species of wild animals. It is generally found in drier range areas of the United States and in Nebraska is reported only in the western section, except for feedlot cattle that originated in the west or southwest.

Considerable attention has been given to ticks in the last few years because of Lyme disease. Only a few cases of the disease have been reported in Nebraska. The main vector for this disease is the deer tick, Ixodes scapularis. The tick has not been found in Nebraska. It is possible but hasn't been proven that other ticks (some of which may be in Nebraska) can transmit the arthritis-like Lyme disease or a similar disease found in Missouri and some other states.

Disease transmission by ticks is called biological transmission. This means that ticks feed on blood of a host infected with the disease. The disease organism may complete its life cycle in the tick and/or multiply to the point that when the tick feeds again, it can transmit the disease to another susceptible animal. Generally the disease organism will pass from adult to egg, or egg to larva, to nymph to adult, in efficient vector species of ticks.

Tick Control

Controlling ticks is difficult and generally requires a combination of cultural, preventive, and pesticide control methods specific for the tick in question. Body or ear ticks on livestock can be controlled with systemic or contact insecticides. The body ticks require a complete skin drench best achieved by dips. However, reinfestation makes this method expensive. Insecticide impregnated ear tags control ear infesting ticks fairly well.

Controlling tick-infested vegetation around the home and using contact residual insecticides in the spring on the fringe areas of the yard when ticks are most abundant reduces tick infestation of children, adults, and pets. Insect repellents for humans and shampoos or collars containing insecticide for pets can help control or reduce tick infestations.

Humans spending time in tick-infested areas should thoroughly examine their bodies after leaving the tick-infested areas with particular attention given to the head, neck, and waist. Ticks usually require several hours of attachment and feeding before they transmit a disease. Tight-fitting clothing around the wrists, neck, waist, and ankles reduces the chance of ticks successfully attaching to a human. Light-color clothing makes ticks easier to see and remove before they can attach. To remove attached ticks, use tweezers to grasp the tick at the point where the mouthparts enter the skin and gently pull until the tick is removed. Avoid breaking off the body of the tick from the mouthparts if possible.

Lyme disease signs and symptoms include a ring-shaped rash at the point of the bite, which usually appears within 3-32 days after the bite. A persistent headache, fever, spreading rash, aching joints, and fatigue are other symptoms. The disease organism is a spirochete bacterium which can be treated successfully with antibiotics, particularly when the disease is recognized early. The Nebraska Department of Public Health has published an excellent pamphlet that details the disease and contains color pictures and disease cycle diagrams. The pamphlet is available at Nebraska Extension offices.

Rocky Mountain spotted fever is caused by a rickettsial organism. Symptoms include severe headaches, chills, fever, and general aches and pains. A reddish-purple-black rash may occur on the bottom of the foot, ankles, palms of the hand, wrists or forearms a few days after infection. The rash may spread to the trunk, neck, and face. If left untreated, the patient may be highly agitated, develop insomnia, become delirious or go into a coma. Antibiotics will control the disease and diagnosis can be confirmed with blood tests.

While the incidence of either of these diseases is very low in Nebraska, the seriousness of the diseases are enough to warrant taking the precautions outlined in this guide to avoid the possibility of infestation. Children and adults should avoid tick-infested areas in the spring and if unavoidable, careful body examinations should be made after leaving the areas in order to detect and remove attached ticks.

This publication has been peer reviewed.

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