Ticks: Life Cycle, Anatomy & Disease Transmission

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Ticks are a common external (on the skin) parasite of many animals, including dogs.
What are ticks?

Ticks are not insects like fleas, flies, and lice, but are arachnids like mites and spiders. There are approximately 850 species of ticks worldwide. Scientists have classified ticks into two families based upon their structure: Ixodidae and Argasidae.

Ixodid ticks
The tick family Ixodidae consists of ticks that have a hard outer covering called a 'scutum,' and therefore, are termed 'hard-shelled ticks'. Table 1 lists the most important hard-shelled ticks for dogs and cats.

Table 1: Ticks commonly found on dogs and cats

Tick	Common Name	Geographic Distribution in U.S.	Tick-associated Disease(s) in Dogs and Cats*
Amblyomma americanum	Lone star tick	Southeast, Midsouth and coastal Northeast	Ehrlichiosis, tularemia, Rocky Mountain spotted fever, tick paralysis
Anblyomma maculatum	Gulf Coast tick	Gulf Coast to Midsouth and lower Midwest	Hepatozoonosis
Dermacentor variabilis	American dog tick	Eastern 2/3 of U.S.; West Coast	Ehrlichiosis, tularemia, Rocky Mountain spotted fever, cytauxzoonosis, tick paralysis
Dermacentor andersoni	Rocky Mountain wood tick	Northwest; Northern Rocky Mountain states	Rocky Mountain spotted fever, tularemia, cytauxzoonosis, tick paralysis
Ixodes scapularis	Eastern black-legged tick (deer tick)	States east of and adjacent to Mississippi River; Eastern TX and OK	Lyme disease, anaplasmosis, tick paralysis
Ixodes pacificus	Western black-legged tick	West Coast and Eastern NV	Lyme disease, anaplasmosis
Rhipicephalus sanguineus	Brown dog tick	Throughout U.S	Ehrlichiosis, Rocky Mountain spotted fever, babesiosis, anaplasmosis, hepatozoonosis, haemobartonellosis

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*See links to articles on these diseases at the bottom of this article.

Argasid ticks

The family Argasidae contains the argasid ticks, which are soft-shelled. Their body lacks a scutum. An argasid has its head located ventrally (on the underside of its body) and when the tick is viewed from above, the head cannot be seen.The soft-shelled ticks or Argasids are fewer in number. The one most known is *Otobius megnini*, also known as the Spinose Ear Tick. It is most common in the Southwest and usually attaches to the ears of animals.

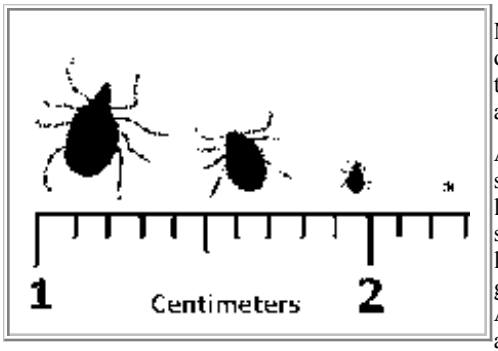
What are the anatomical features of ticks?

All ticks have three pairs of legs during the immature stage and four pairs as an adult. They crawl but cannot fly since they have no wings. Ticks possess a sensory apparatus called 'Haller's organ.' This structure senses odor, heat, and humidity. This is how the ticks locate their food source. They climb upon tall grass and when they sense an animal is close by, they crawl on.

What do ticks eat?

A tick's diet consists of blood and only blood. The tick imbeds its mouthparts into the animal's (or human's) skin and sucks the blood. Except for the eggs, ticks require a blood meal to progress to each successive stage in their life cycle.

What is the life cycle of a tick?



Most ticks are what we call three host ticks, that is, during their development which takes two years, they feed on three different hosts. All ticks have four stages to their life cycle: egg, larvae (seed tick), nymph, and adult. Let us look at the life cycle of the deer tick, as an example.

Adult female deer ticks lay eggs on the ground in spring. Later in the summer (depending on moisture and temperature), the eggs hatch into larvae. The larvae, which are smaller than the period at the end of this sentence, find an animal (the first host, which is usually a bird or rodent), live off its blood for several days, then detach and fall back onto the ground. For deer ticks, this most commonly occurs in the month of August. In the ground, the well-fed larvae now molt into the next stage and are called nymphs.

Each female tick lays approximately 3,000 eggs.

The nymphs remain inactive during the winter months and in spring become active. The nymph now finds an animal (the second host - a rodent, pet, or human) and feeds again. Once well fed, the nymph detaches and falls back to the ground. Here it molts and changes into an adult. Throughout the fall, both adult male and female ticks now find another animal (the third host - a rodent, deer, pet, or human) and feed on blood and mate. Once well fed, both males and females fall back to the ground. The male now dies and the female lives through the winter and lays eggs in the spring, completing the cycle. If the adults cannot find a host animal to feed on in the fall, they will survive in the leaf litter until the next spring when they will feed, mate, and produce eggs.

Other species of ticks may be at peak activity for each life stage at different times of the year than the deer tick we described. Your local university or health department may have information on peak tick activity in your area.

What diseases do ticks transmit?

Ticks can transmit or cause:

- Anaplasmosis
- Babesiosis (Piroplasmosis)
- Cytauxzoonosis
- Ehrlichiosis
- Haemobartonellosis in Dogs and Cats
- Hepatozoonosis
- Lyme Disease
- Rocky Mountain Spotted Fever
- Tick Paralysis
- Tularemia in Dogs and Cats

See our article on Tick Control for more information on how to prevent tick-borne diseases in dogs.

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