
Winter Tick (*Dermacentor albipictus*)

Winter tick is the only species of one-host tick in New Hampshire. Unlike other hard ticks, which feed on two or more hosts in their lives, it remains on a single host. Moose are the most common and severely impacted host for winter tick.



Adult winter ticks: Alan T. Eaton

The adult males (left side of photo) look different from the adult females (right side of photo). Body length for the unengorged (yet to have a blood meal) adult male is 3 to 4 millimeters (less than $\frac{1}{4}$ inch). The fully engorged females are much larger and drop off their host in late winter or early spring. They lay eggs in masses of up to 3,000 in the leaf litter close to where they dropped.

Eggs hatch in August and September. After hatching, the larvae climb vegetation to wait for a host to brush by. In many cases, they wait in clumps of a few to more than 1,000 at the tips of low vegetation (20 to 75 inches tall).

Before feeding, larvae are about 0.8 millimeters long. Questing behavior (waiting on plants for a host) slows as temperatures fall below freezing, and once snow covers the ground, questing effectively stops. Strong winds (mid-September through mid-November) can blow many larvae off vegetation, reducing their success at finding hosts.

Larvae that are lucky enough to have a host brush against them climb aboard and remain on that animal until they die (males) or until they have fully engorged as adults (females). They take one blood meal as larvae and a second as nymphs. During the time that they aren't feeding, they remain holding on to the fur of the host, without embedding their mouthparts.

In New Hampshire, we examined deer and moose at hunter check stations in October and November (Deer: 1989, 1990, 1991, 1996; moose: 1990, 2008-10). We sometimes found a few winter ticks on whitetailed deer. Moose were usually heavily infested, especially adult males. The photo at right shows engorged larvae and unengorged nymphs, both about 2 millimeters long, feeding on a moose.



Engorged nymphs among hair on moose:
Alan T. Eaton

Despite the hundreds of winter ticks seen, we never found any adults in these surveys, because the surveys were conducted in the fall. Triggered by changing day length, winter ticks don't transform into the adult stage until later in winter.

Work by William Samuel in Alberta showed that the first adults appear in late January. Engorged females appear in late March or April. UNH specimen records fit that pattern, too.

Once fully engorged, the females drop to the ground, slowly digest their huge blood meal, and lay their eggs. The rate at which this occurs depends on temperature. If the females fall onto snow, survival (to the point where they lay eggs) is poor. If they fall onto bare forest floor, many more survive. When females drop off in thick conifers, fewer larvae hatch compared with more open habitat. This may be because open habitats are warmer and allow better egg-hatch. Thus late snowmelt in spring results in lower numbers of tick larvae the following fall, while early snowmelt causes higher winter tick numbers the next fall. The weather over summer may also affect numbers. If it is extremely dry, survival of eggs and larvae may be poor.

Numerous published studies by Samuel and his students show that deer are effective at removing winter ticks from their bodies (they do so early), while moose are not.

In late winter and early spring, heavily infested moose rub against trees and groom the heavily infested spots with teeth and hooves. This damages the protective coat of hair, and hair loss follows a predictable pattern, starting around the shoulders. With many guard hairs broken off, the animal's coat appears light gray or tan, instead of dark brownish black. The photo at right shows such an example in May, from northern New Hampshire.



**Walking moose with heavy hair loss:
Dan Bergeron, University of New Hampshire**

Heavily attacked moose suffer significant blood loss at a time when forage quality is poorest. Also, they spend less time feeding, and more time scratching and grooming. Tick infestation (by *Boophilus* species) in

cattle has been shown to result in loss of appetite, and lower weight gain. Samuel speculates that there might be an appetite effect on moose, too.

Heavily infested moose have low fat reserves and have lost the thermal protection of their coat. More than 150,000 winter ticks were reported from one moose by Samuel and Welch, in Alberta. Most moose deaths from winter ticks occur in April [Samuel, Alberta]. Calves are often at greatest risk and can suffer high mortality, because they carry the highest tick loads (relative to body size) and are usually in poorest physical condition in early spring.

In areas of high moose density, in bad winter tick years, blood and/or ticks can be found in moose trails and moose beds in the snow in late March and April (photo, next page). When conditions are right for a tick outbreak, large die-offs of moose can occur. The most recent year with significant New Hampshire



Moose beds in snow, showing blood: Eric Aldrich

moose deaths from ticks was 2002. There were die-offs in Maine, Vermont, and parts of Canada at that time.

Forest harvesting creates preferred fall and spring habitat (browse) for moose. Because moose preferentially use this habitat during the time winter ticks quest (fall) and drop from their hosts (late winter/early spring), it may influence the distribution and abundance of winter ticks. Creating preferred moose habitat may increase moose density, which could increase winter tick numbers.

Conditions that favor high numbers of winter ticks include relatively high moose density, early snowmelt in late winter/early spring (better survival of engorged adults), lack of summer drought (better survival of eggs), and relatively warm fall and early winter temperatures, with relatively little snow during that time (extends the larval questing period).

Samuel reports that magpies are often seen in winter perched on animals and eating ticks. They have also been seen picking ticks out of moose beds. He mentions that gray jay and raven have also been reported feeding on winter ticks. Eric Aldrich (The Nature Conservancy, Concord, N.H.) has observed ravens picking ticks from moose beds in the snow in New Hampshire.

Winter ticks will bite domestic animals and people if given the opportunity. Several New Hampshire deer hunters have sent UNH specimens found on their clothing. One had more than 50 larvae on his glove. Horse owners have also submitted specimens of ticks biting their animals in late fall or winter.

Winter ticks don't prefer one mammalian host over another. Animals that walk through vegetation with many questing larvae acquire more ticks than those that walk through less-infested vegetation. The peak questing period for winter tick coincides with the peak moose-breeding period. That's when moose are very active and therefore more likely to come in contact with clumps of questing ticks.

The average questing height for winter tick is average chest height for moose or deer. Animals that are active groomers such as white-tailed deer remove ticks early with teeth and/or hooves. Moose start grooming in response to irritation very late in the tick-infestation phase. That means they begin when the blood loss (and presumably the irritation) is getting significant.

Winter ticks aren't known to pass diseases to humans or domestic animals. That makes sense, since they don't feed on multiple hosts. New Hampshire's other tick species are three-host ticks: a female lucky enough to complete its life cycle first feeds on one host as a larva, then (weeks or months later) feeds on another as a nymph, and finally feeds on a third host as an adult. These multi-host species pick up a disease organism from one host and pass it on to another host later in life.

Protecting yourself from being bitten by winter ticks is relatively easy. They are active at a time of year when most people wear multiple layers of clothing. Tucking pant legs into socks or boots will make it unlikely that ticks you encounter can reach your skin.

Any ticks you find on clothing can be picked or brushed off. The larvae survive poorly in very dry situations, and could die within 24 hours. If you need to be sure ticks die quickly, hang clothing by a wood stove or run it through a clothes dryer. Heavily infested clothing could even be placed in a plastic bag, and put in a microwave oven to kill the ticks.



Engorged female in snow, moose bed: Eric Aldrich

Any ticks that have started biting you should be removed promptly. They will be small (larvae or nymphs), so a pair of tweezers or forceps may be helpful. Grasp the tick firmly, as close to the skin as possible, and apply steady pressure to pull it out. Don't yank it out, or the mouthparts may break off, and stay embedded in your skin.

Additional Reading and Information

Samuel, Wm, 2004. *White as a Ghost*. vi + 100 pp illus. Altona, Manitoba. Federation of Alberta Naturalists. ISBN 0-9696134-6-6

Bergeron, Daniel, 2011. *Assessing Relationships of Moose Populations, Winter Ticks, and Forest Regeneration in Northern New Hampshire*. xiii + 102pp. Master of Science Thesis, University of New Hampshire

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