Managing Winter Tick, \textit{Dermacentor albipictus}, on White-tailed Deer Farms and Hunting Preserves

While the winter tick, \textit{Dermacentor albipictus}, is frequently a health concern in moose, it is only recently that this tick has been documented to kill elk and white-tailed deer. In fall 2020, three captive white-tailed deer were found dead in a wooded enclosure and covered in thousands of winter ticks (Machtinger et al. 2021). These deer did not exhibit the hair and weight loss typically observed when moose become overburdened with winter ticks, but they did exhibit signs of extreme lethargy consistent with anemia. However, these tick infestations appeared to occur much more quickly than in wild animals, and the ticks were likely in the paddocks into which the deer were released. Therefore, it is possible that deer may exhibit other signs of winter tick infestation, such as hair loss or losses in body condition, as seen in moose and elk. As average winter temperatures rise, it is important to consider what preventive methods can be used to reduce the risk of deer loss from exposure to winter ticks.

**Identification**

The winter tick is about ¼ inch in length, with adult females reaching to ¾ inch when engorged. Larvae and nymphs are brown and somewhat nondescript. Adult females are reddish brown with a patterned dorsal shield (the area right behind the mouthparts on the back; Figure 1a). The males are a darker reddish-brown color (Figure 1b). In most areas, winter tick males are highly patterned with cream crosshatching or swirls on the back (Figure 1c). However, in some areas, males have

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**Figure 1.** (a) female, (b) male unpatterned, and (c) male patterned winter tick, \textit{Dermacentor albipictus}. Photo credits: (a) Griff n Dill, University of Maine Cooperative Extension; (b) Erika Machtinger, Penn State Extension; and (c) Griff n Dill, University of Maine Cooperative Extension
no pattern and can be confused for other tick species like the Asian longhorned tick or brown dog tick. Patterned adults may be confused for another common species in this genus, the American dog tick (*Dermacentor variabilis*; Figure 2), although the latter is not frequently found on hooved animals at high densities. Blacklegged ticks, or deer ticks (*Ixodes scapularis*), are also commonly found in high numbers on white-tailed deer.

**Biology**

The winter tick is found throughout North America. The range of this tick extends across the entirety of the United States and into Mexico and Canada. Common host species of winter tick include livestock (primarily cattle) and cervids (hooved animals) like moose, elk, caribou, and deer. It has also been reported on humans and domestic animals, such as dogs, cats, and horses, in some regions.

The winter tick has a one-year life cycle and goes through four life stages during this period: egg, larva, nymph, and adult (Figure 3). Unlike many of the common ticks affecting people and animals in the Northeast (i.e., the blacklegged tick, lone star tick, and American dog tick), the winter tick is a one-host tick—meaning that this species takes all the blood meals it requires throughout its lifetime from one host animal. Female ticks lay eggs on the ground in midsummer, and the eggs hatch in late summer into the fall. The larvae find a host animal in early fall and, after feeding from that host, molt into nymphs during the fall and into the winter. Nymphs will feed and molt into adults in late fall or during the winter. The final blood meal provides the nutrition the adult female needs to produce eggs. The life cycle of this tick species has been noted to be affected by warmer winters. A warmer environment can lead to higher populations of winter tick later in the season and their life cycle may be accelerated, leading to life stages being found earlier than expected (e.g., adult ticks being found in early fall instead of late fall).

**Veterinary and Medical Concern**

Because the winter tick is a one-host tick, disease transmission between host animals or to humans is less likely. Some studies have shown that the winter tick could potentially transmit the pathogens *Rickettsia rickettsii* and *Anaplasma marginale*, but there is not strong evidence supporting that this tick species acts as a significant disease vector.

However, because the winter tick remains on a host for a longer period than other tick species, it can more consistently burden an animal’s health throughout the year. Combined with the winter tick’s tendency to search for and attach to hosts in clusters, this means that, in the most extreme cases, tens of thousands of winter ticks can be attached to one animal at a time (Figure 4). Tick loads this high in moose and elk often cause hair, blood, and weight loss in the host. Secondary infection, itching and overgrooming that can lead to cold exposure, and exsanguination (depletion of blood) from tick infestations can result in death of the animal.

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**Figure 2.** (a) male and (b) female American dog ticks, *Dermacentor variabilis*. Photo credit: Erika Machtinger, Penn State Extension

**Figure 3.** The winter tick, *Dermacentor albipictus*, is a one-host tick. Once larvae find a host, they remain on that host as larvae, nymphs, and adults until adult females drop off to lay eggs. Photo credit: Image made by Erika Machtinger on Biorender.com
Prevention

In some cases, landscape and facility management can be used to help reduce the risk of infestation by any species of tick, including the winter tick. This can be difficult when managing preserves or more natural “forested” settings in hunting preserves, but for pastured animals, moving the fence line 10 feet from the edge of the woods and keeping vegetation in those corridor areas mowed short and free of debris can prevent tick movement toward animals.Ticks can dry out quickly, so they are not often found in low-cut grasses and sunny areas. Because of this, treating pastures and other open spaces with acaricides (pesticides targeting ticks) is not necessary, but wooded edges can be treated with acaricides to try to reduce tick numbers in the area.

Eliminating brush and woody debris such as fallen branches from the perimeter of pastures can reduce habitat for other animal hosts. To reduce the risk of introducing ticks into a facility, it is important to exclude wild deer and other animals from pens where there are captive deer.

Weather conditions over the previous year should also be taken into consideration. The winter tick’s life cycle can exhibit extreme variation with abnormal weather patterns, and survival rates often increase after mild winters. Animals should be visually inspected frequently for ticks and changes in behavior. Some signs of tick infestation include:

- Unusual lethargy
- A “rough” appearance, bumps in the fur, or hair loss
- Grooming or scratching that occurs more often than normal
- Loss of body condition or poor growth

Self-treatment devices for deer in pens may also be an option. Four-poster feeders can be used to treat deer on a regular basis. These large feeders have four rollers attached to posts on metal springs (Figure 5). There is a small area where deer feed, and as the deer turns its head, the rollers apply the acaricide permethrin to its ears, head, and neck, common areas for tick attachment. While the feeders typically use corn, any feed can be used. Weekly maintenance includes the application of permethrin to the rollers and cleaning debris from the troughs.

A current distributor of a four-poster feeder is CR Daniels, [https://crdaniels.com/shop/ols/categories/4-poster-deer-feeder](https://crdaniels.com/shop/ols/categories/4-poster-deer-feeder).

Veterinary Treatments

No products are currently labeled to treat or prevent tick infestations in captive cervids. However, some products, including injectable and topical products, can be used off-label under the direction of a veterinarian. Talk with your veterinarian about managing ticks so you have a plan in place should your deer have tick-related problems.
Always refer to the insecticide label for current and specific use and application instructions. *It is important to read, understand, and follow all insecticide label precautions.* Before applying any product (including natural or biological control products), note application rates. In addition, only apply products that are labeled for use in the state of application.

**Did You Find a Tick?**

Send specimens to:
Penn State Insect Identification Laboratory
501 Agricultural Sciences and Industries Building
University Park, PA 16802
Or submit a photo via email to mxs1578@psu.edu

Veterinarians can send specimens to:
PennVet Diagnostic Laboratories Clinical Parasitology Lab
3900 Delancey Street, Philadelphia, PA 19104

**References and Further Reading**


University of Maine Cooperative Extension Tick Lab. "Winter Tick or Moose Tick." https://extension.umaine.edu/ticks/maine-ticks/winter-tick-or-moose-tick/.


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