W 1255

LONGHORNED TICK AND BOVINE THEILERIOSIS TENNESSEE 2024 UPDATE

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The longhorned tick (LT) is a species of hard tick in the family Ixodidae (Figure 1). It is native to eastern China, Japan, the Russian Far East, and Korea. It has also established populations in Australia, New Zealand, and several Pacific islands, where it is considered a severe exotic pest of livestock. In late 2017, the United States Department of Agriculture's National Veterinary Services Laboratories (NVSL) confirmed the presence of the longhorned tick in the United States (U.S.). These ticks were first identified in New Jersey but have since been found in samples from West Virginia dated as far back as 2010. The most likely area of origin is East Asia, although it is possible that the tick originated from more than one source, as it has been determined that at least three unrelated female longhorned ticks initially entered the U.S. The route of entry remains unknown, but possible importers of the original longhorned ticks include domestic pets, horses, livestock, or humans. While imported livestock animals have strict quarantine and treatment requirements, there are no such regulations for pets at the U.S. border. The real impact of the introduction of this species into the U.S. is not clear currently, but animal health officials are concerned about livestock health because of its ability to transmit *Theileria orientalis* Ikeda, which can lead to Bovine Theileriosis.

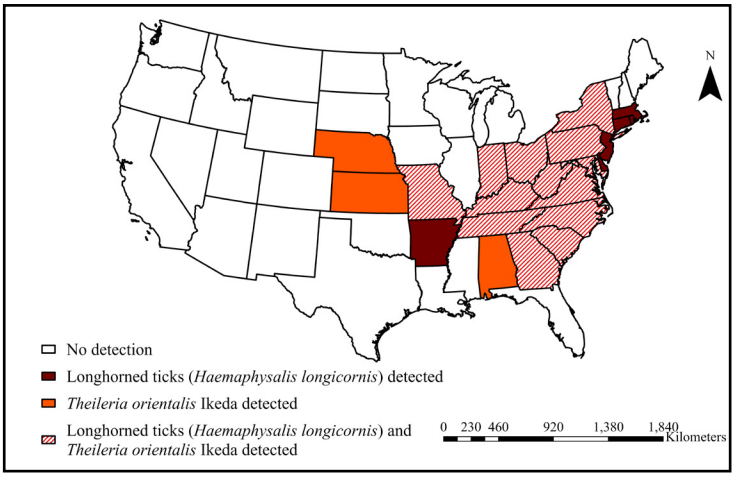

Figure 2. *States with confirmed detections of longhorned ticks (*Haemaphysalis longicornis*) and* Theileria orientalis *Ikeda as of March 2024.*

Figure 1. *Top-down (dorsal) view of a female adult longhorned tick. Photo Credit: Katy Smith.*

TICK SPECIES

Haemaphysalis longicornis Neumann (common names include Asian longhorned tick, longhorned tick, Asian tick, bush tick, scrub tick, New Zealand cattle tick).

U.S. GEOGRAPHIC DISTRIBUTION

Since its detection in 2017 and as of March 2024, longhorned ticks have been confirmed in at least 19 states including Arkansas, Connecticut, Delaware, Georgia, Indiana, Kentucky, Massachusetts, Maryland, Missouri, North Carolina, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, and West Virginia (Figure 2). A travel-associated case has been reported in New Hampshire. Tennessee was added to the list in May 2019 when the tick was discovered on a dog in Union County and on a cow in Roane County. As of March 2024, longhorned ticks have been confirmed in 11 Tennessee counties including Claiborne,

Cocke, Grainger, Jefferson, Knox, Maury, Roane, Putnam, Sevier, Union, and White (Figure 3). This tick species can be found in many places in the environment including hardwood forests, grassy fields, and manicured lawns. It prefers mild temperatures and humid climates.

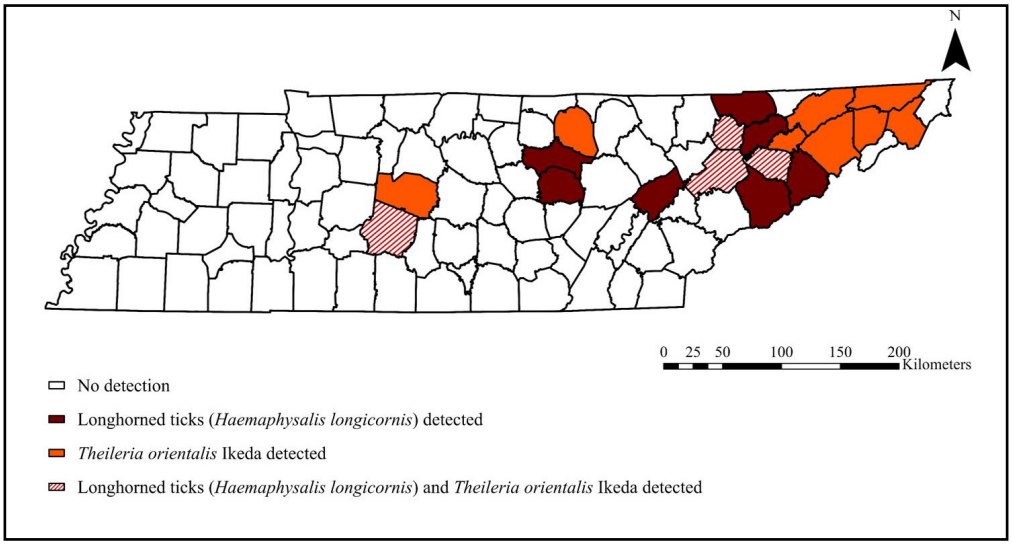

Figure 3. *Tennessee counties with confirmed detections of longhorned ticks (*Haemaphysalis longicornis*) and* Theileria orientalis *Ikeda as of March 2024.*

IDENTIFICATION

Longhorned ticks (Figure 4) have a light brown/red coloration and do not have distinctive markings on their scutum (back). The adult female grows to about 10mm (0.4 in) in length when bloodfed and has a large spur on basal palpal segment (circled in red), which is a portion of the mouthpart viewed from the underside (Figure 5). Males are rare, and as of printing only one has been found in Ohio. Immature life stages are very small; nymphs are about the size of a poppy seed and larvae are even smaller. See Beef and Forage Center website for **Beef Cattle: Pests and Associated Problems**.

Figure 4. *Top-down (top) and underside view (bottom) of larva, nymph, and female longhorned ticks. Photo Credit: Jackson Turner.*

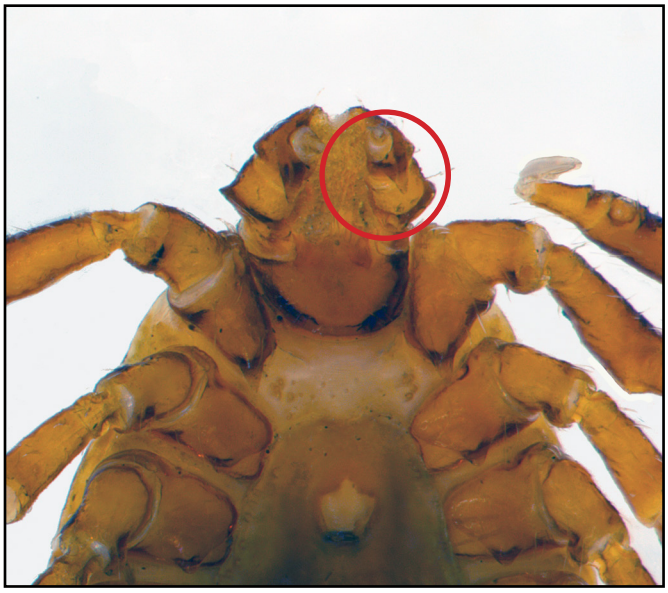

Figure 5. *Underside view of the longhorned tick mouthparts with large spur on its basal segment (circled). Photo Credit: Jackson Turner*

A remarkably similar species, the rabbit tick *Haemaphysalis leporispalustris*, is native to the U.S. and is commonly found on wild rabbits and hares. *Haemaphysalis longicornis* is easily misidentified or confused with *H. leporispalustris*, so anyone suspecting the presence of the non-native longhorned ticks is encouraged to collect specimens and submit them for identification by appropriately trained personnel. Commonly encountered tick species in Tennessee include the Lone star tick, American dog tick, Blacklegged (deer) tick, and the Gulf Coast tick.

WHAT ANIMAL SPECIES HAVE LONGHORNED TICKS BEEN FOUND ON IN THE U.S.?

The longhorned tick is a generalist feeder and has been found on many mammal species and birds, although they are more likely to be present on medium-sized mammals compared to other species. The longhorned tick has been collected from mammal species such as humans, pets (i.e., cats and dogs), livestock (i.e., cattle, horses, sheep, goats, and pigs), and wildlife (i.e., black bears, white-tailed deer, elk, coyotes, gray fox, red fox, Virginia opossum, raccoon, striped skunk, groundhog, Eastern cottontail rabbit, gray squirrel, Eastern chipmunk, and white-footed deer mice). Bird species found to have been infested with longhorned ticks include the Canada goose, great horned owl, barred owl, red-tailed hawk, chicken, Northern cardinal, blue jay, gray catbird, brown booby, Carolina wren, house wren, and the song sparrow. This is not an exhaustive list, and it continues to grow as more tick surveys are conducted in the infested areas. This tick species is more often found on the underside of animals compared to the ears/neck/head region.

LIFECYCLE

This species has a unique reproductive strategy such that females reproduce asexually, meaning females can reproduce without mating with a male (~clonal). There also can be multiple generations of longhorned ticks in a single year. For example, longhorned ticks can complete their life stage in as little as six months compared to the two- or three-year life cycle of Tennessee native tick species. It is highly likely that translocation of a single tick is sufficient to start a new population; in other words, a single nymph that molts to an adult is already a reproductive female. The longhorned tick is a three-host tick, indicating it will feed on a different host for each life stage (larva, nymph, and adult). This use of a variety of host species, combined with the longhorned tick's asexual reproductive strategy, is important, and this tick's dispersal is likely linked to the dispersal capabilities of its hosts.

After each bloodmeal, the tick falls off its host and either develops to the next life stage or, if it is an adult female, will lay her eggs under the leaf litter. A single female can lay up to 2,000 eggs. One six-legged larva hatches from each egg and must find a host to blood feed. After feeding, the larva drops off the host and returns to the vegetation (e.g., leaf litter) to molt into an eight-legged nymph. Each nymph must then find a new host for a blood meal, where it feeds and returns to the leaf litter to molt into the reproductive adult. Data from the University of Tennessee indicates that nymphs may be the primary overwintering stage and become active in March and remain active through September (peaking in spring). Adults are active April through September (peaking in summer months), and larvae are active April through November (peaking in fall months). In some locations where the weather is warm and hosts are abundant, all three life stages may be active in the same month (June) and can develop from egg to adult in six months. While researchers at the University of Tennessee have collected these ticks in open pastures, they are most often found in forested and forest-field edge habitats.

Each life stage responds differently to climatic variables. For example, larvae are more likely to be collected as temperatures are warming, nymphs as relative humidity and barometric pressure decrease, and adults when relative humidity increases. Additionally, longhorned tick populations vary based on populations of other tick species. UT researchers discovered that increasing collections of Lone star ticks and American dog ticks were both associated with decreased number of longhorned tick collections, and these associations vary by life stage. Longhorned tick larvae were found to decrease when Lone star tick nymphs and adult males increased. Longhorned tick nymphs were also found to decrease as larval Lone star ticks and female American dog tick populations increased. Finally, longhorned tick adult female collections decreased as American dog tick populations increased.

IMPACT

This tick has established populations primarily in the eastern region of the U.S., and there is great concern amongst animal health officials about the potential impacts on livestock and wildlife. Since longhorned ticks can create large populations quickly, these ticks often populate animals and farm environments in greater numbers compared to native Tennessee ticks. This enhances the longhorned tick's capability to feed in larger numbers on warm-blooded hosts which can lead to reduced growth, weight loss, decreased milk production, pelt/hide damage, abortion, anemia, and death in severe cases. Bovine Theileriosis is a global disease of cattle caused by a tick-borne hemoparasite that infects red and white blood cells, resulting in bovine infectious anemia. Clinical signs of Theileriosis resemble Bovine Anaplasmosis, and diagnosis is required to be confirmed by a veterinarian and diagnostic lab. These signs include anemia, high fever, weakness, elevated heart and respiratory rates, and abortions. Cattle mortality rates due to this disease range from 5-90 percent, and once an animal is infected it remains infected. In other words, infected animals are carriers for life. Prevention and management of the longhorned tick is imperative, as there is no currently approved vaccine or treatment for cattle with Bovine Theileriosis. This disease has followed the spread of the longhorned tick, and as of March 2024, has been confirmed in Alabama, Indiana, Kansas, Kentucky, Missouri, Maryland, North Carolina, Nebraska, New York, Ohio,

At this moment, the primary concern for longhorned ticks in Tennessee is their ability to transmit *Theileria orientalis* Ikeda to cattle, causing Bovine Theileriosis.

Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. In Tennessee, this disease has been confirmed in 12 counties including Carter, Green, Hamblen, Hawkins, Jefferson, Knox, Overton, Maury, Sullivan, Union, Washington, and Williamson counties. See **UT Extension Publication W 1150 Theileria orientalis Ikeda** in Tennessee for more information.

The best way to protect your livestock from the negative impacts of longhorned ticks and *Theileria orientalis* Ikeda is a proactive, preventative approach centered around biosecurity, animal monitoring, and record keeping.

DETECTING LONGHORNED TICKS ON CATTLE

It is important to detect longhorned tick populations early and prevent them from establishing on your property. Longhorned ticks have been collected as early as March, and it is recommended that monitoring efforts begin when daylength begins to increase and end when daylength begins to decrease. Regularly inspect your animals for ticks, focusing on the head, ears (inside and outside), armpits, groin, and around the tail head. See **Beef Cattle: Pests and Associated Problems.** To aid in rapid discovery and response efforts, we recommend inspecting your animals for ticks as often as possible (ideally every third week or every other week if ticks are noticeable on your property). Additionally, quarantine and thoroughly inspect all new animals brought onto your property before they are introduced to animals that are already present and apply an appropriate acaricide with a two-week efficacy.

You also can routinely inspect your property for longhorned ticks using a drag cloth. See **Beef Cattle: Pests and Associated Problems.** These can be constructed using a 3 feet by 3 feet light-colored corduroy cloth attached to a wooden pole with a thick string to pull the cloth along the ground. This allows for ticks to be collected from the environment while they are searching for a host. Pause to check both sides of the drag cloth every ~30 feet. Ticks can be collected with forceps and stored in vials of 80 percent ethanol or use a lint roller and seal the sheet in a plastic bag. Forest-field edge and forested habitats have been predicted as the most likely area to find all three life stages of longhorned ticks. Read **UT Extension Publication PB 1895 Managing Ticks on School Grounds** to learn more about using a drag cloth for surveillance and additional ways to reduce ticks around your property.

PREVENTING AND MANAGING LONGHORNED TICKS ON COW-CALF FARMS

An on-farm study conducted by the University of Tennessee found that a combination of keeping a closed herd, cutting brush monthly, using on-animal acaricides, and dragging for ticks weekly reduced the presence of longhorned ticks by 90 percent. With this in mind, we recommend using an integrated pest management approach, combining cultural, mechanical, and chemical control methods to reduce longhorned tick populations. Cultural controls (habitat modification) include keeping grass and weeds trimmed and clearing overgrown brush in pastures and yards. We recommend bushhogging pastures monthly to "knee high" to minimize suitable tick habitat. After mowing but before transporting, equipment should be treated with an appropriately labeled acaricide to prevent accidental introductions or potential tick movement from pasture to pasture. The mechanical dragging method used to inspect your property can also be applied to physically remove ticks that are present. Under the advisement of your veterinarian, chemical control options can also be explored. Appropriately labeled on-animal acaricides such as ear tags, pour-ons, and sprays have shown to be beneficial in controlling longhorned ticks, as these ticks are currently susceptible to pyrethroid products. However, relying solely on chemical control options is costly and could lead to rapid development of acaricide resistance, which would render these products ineffective, particularly in clonal ticks like the longhorned tick.

Visit the **VetPestX page on the Veterinary Entomology** website for up-to-date pesticide recommendations for your state.

WHAT TO DO IF YOU FIND A TICK OR MULTIPLE TICKS ON YOURSELF, YOUR PET, OR YOUR LIVESTOCK

If you find a tick attached to a person, pet, or livestock, remove it immediately. If available, use fine-tipped tweezers to remove the tick. If you do not have tweezers, use tissue paper to help grip the tick. Grasp the tick as close to the skin as possible and gently pull the tick out with steady and even pressure. It is important not to twist or jerk when pulling the tick out as this may lead to the mouthparts remaining embedded, which will increase the risk of infection. Do not use nail polish, petroleum jelly, alcohol, or hot matches to remove the tick. Wash the wound with soap and water and apply an antiseptic after the tick is removed.
See **Beef Cattle: Pests and Associated Problems**.

Place the removed tick into a sealable bag. Label the bag with host (person or animal), date, geographic location of removal. Removed ticks should be stored in a freezer for a few months in case any disease symptoms develop and/or the tick needs to be identified.

SUBMIT TICKS FOR IDENTIFICATION

Ticks can be submitted to your local county Extension agent or directly to the University of Tennessee for identification using the following intake form: **tiny.utk.edu/tickintakeform**

FOR MORE INFORMATION

Visit the UT Beef & Forage Center page for Beef Cattle: Pests at **tiny.utk.edu/pests**

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