

Southern Tick-Associated Rash Illness (STARI)

A rash has been noted following the bite of the lone star tick in south central and southeastern states and given the name Southern tick-associated rash illness (STARI). The rash is similar to that caused by Lyme disease bacterium, *Borrelia burgdorferi*. The causal agent for STARI remains unknown. While the lone star tick does not transmit *B. burgdorferi*, it is a vector for tularemia and spotted fever rickettsiosis.

Gulf Coast Tick-Associated Diseases

Infection by *Rickettsia parkeri* from the bite of the Gulf Coast tick initially results in a necrotic eschar (lesion), generally within 2-10 days after the bite of an infected tick, followed in a few days by fever, a vesicular rash, headaches, and body aches. Patients generally recover completely from *R. parkeri* rickettsiosis following antibiotic treatment. This disease is considerably milder than Rocky Mountain spotted fever with no severe symptoms or deaths. Infection rates in the adult ticks generally range 20-40%. In CT, 30% of specimens of this species has been found to be infected with *R. parkeri*.

Asian Longhorned Tick-Associated Diseases

In its native range, multiple pathogens have been associated with *H. longicornis*, including *Anaplasma*, *Babesia*, *Ehrlichia*, *Borrelia*, *Rickettsia*, Powassan virus, and a severe haemorrhagic fever virus, but as of 2022, the risk of human disease in the U.S. remains unclear. In the laboratory, this tick was found incompetent to transmit the Lyme agent, *B. burgdorferi*, but could transmit the agent of Rocky Mountain spotted fever. In most areas in the world where this tick occurs, it has been considered mainly a livestock pest. In the U.S., this tick has been found to transmit *Theileria orientalis* Ikeda that can cause severe disease in cattle. Cattle have also been reported killed from anemia caused by heavy tick infestations.

Tick Control

Application of acaricides (insecticides) remains the primary method for reducing tick populations, particularly for residential areas. Because lone star ticks, Asian longhorned ticks, and, to a lesser extent, Gulf Coast ticks generally are not found on rodent hosts, commercial rodent targeted tick tubes and acaricide-treated bait boxes used for the blacklegged tick, *Ixodes scapularis*, would not be an option for these ticks. Deer-targeted approaches may be more appropriate. A number of products are available for managing ticks on pets (see the companion animal factsheet on the CAES website).

Tick Repellents & Checks

Insect (and tick) repellents applied to skin and/or clothing can provide substantial protection from tick bites. The primary ingredient in most repellents is DEET. Others for ticks include picaridin, oil of lemon eucalyptus, and IR3535. For use only on clothing, products with permethrin, a pyrethroid insecticide, are available as a spray or on pretreated clothing and work by killing ticks on contact with treated clothes. Prompt removal of attached ticks will reduce the chance of infection.

Tick Removal



To remove a tick, use thin-tipped tweezers or forceps to grasp the tick as close to the skin surface as possible. Pull the tick straight upward with steady even pressure. Disinfect the area with rubbing alcohol

or another skin disinfectant; a topical antibiotic may also be applied. Save the tick for identification or testing and evidence of tick bite. If you suspect a tick-borne illness, consult your physician.

Steps to Reduce the Risk of Tick-Borne Diseases

1. Be aware of tick infested areas
 2. Wear long pants tucked in socks
 3. Consider using EPA-registered insect (or tick) repellents
 4. Bathe and look/feel for ticks after leaving tick habitat, and remove any ticks
 5. Have ticks properly identified
 6. or tested
- Check pets and livestock for ticks, use tick control products as suggested by your veterinarian

Further information on tick biology, exotic and invasive ticks, tick-bite prevention and environmental tick control is available on the CAES and CDC websites.

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All Photo Credits CAES except *E. chaffeensis*, Female Lone Star Tick (front cover) Adult Female Asian Longhorned Tick (front cover), CDC.



Lone Star Tick, Gulf Coast Tick, Asian Longhorned Tick & Tick-Borne Diseases



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Lone Star Tick

Amblyomma americanum

The lone star tick is the most common human-biting tick in the southeastern United States. With established populations in Fairfield and New Haven Counties, CT, the tick has also become abundant through southern New York, areas of coastal New England, parts of Cape Cod and the adjacent islands in MA. Female ticks have a conspicuous spot on the end of the scutum. Male ticks have faint white markings at the edge of the body. All stages are active during the summer months. Adults are more active in the spring and early summer, while nymphs are active from April through the summer.



Adult female lone star tick

Larvae are most abundant in the late summer and early fall. White-tailed deer are a major host for all feeding stages of this tick while the immature stages feed on a diversity of birds, particularly turkeys. Populations of this

tick are expected to increase along the northeastern coastal states. This aggressive tick can be encountered in large numbers leading to multiple tick-bites that produce erythematous pruritic (itching) papules. This tick is a vector for ehrlichiosis, *Rickettsia parkeri* rickettsiosis, tularemia, Heartland virus, and Bourbon virus. This tick is also associated with alpha-gal syndrome (red meat allergy).



Gulf Coast Tick

Amblyomma maculatum

The Gulf Coast tick was originally distributed along the southeastern coastal states, hence its name. However, the tick's range has expanded into the mid-Atlantic states in recent years with established populations detected in coastal New York and Fairfield County, CT, in 2020 and 2021.

The adult ticks resemble American dog ticks and may be confused with them. However, they have longer mouthparts characteristic of the *Amblyomma* ticks.

Immature stages of this tick parasitize a large diversity of birds and small mammals, while adult ticks are found on medium-to-large mammalian hosts like coyotes, dogs, cattle, swine, and white-tailed deer. All feeding stages of this tick will bite humans. In Connecticut, the tick is active from April through early fall. This tick is principally associated with various grassland type habitats with some shrubs.



Adult female Gulf Coast tick

The Gulf Coast tick is of both public and veterinary health concern, as it is the primary vector of *Rickettsia parkeri* and *Hepatozoon americanum*, causative agents of spotted fever rickettsiosis and American canine hepatoozoonosis, a severe disease of dogs, respectively. *R. parkeri* causes a disease similar to, but milder than, Rocky Mountain spotted fever. Heavy infestations can cause considerable irritation and weight and blood loss in cattle and other livestock. Populations of this tick are expected to increase along the northeastern coastal states.

Exotic Ticks

Non-native ticks are brought into the United States by human travelers returning from abroad and on animals imported through active international trade. Many of the ticks from these hosts can carry human pathogens or are potential vectors of pathogens of wildlife and domestic livestock. There are a number of bacteria including rickettsial pathogens as well as encephalitis and hemorrhagic fever viruses carried by ticks in Europe, Asia, Africa and Australia. For example, travelers have returned to Connecticut with species of *Amblyomma*, *Rhipicephalus*, and *Hyalomma* ticks and a few diagnosed with Mediterranean spotted fever. Tick bite prevention measures should be taken by travelers to potentially tick-infested areas abroad.

Asian Longhorned Tick

First detected on a sheep in New Jersey in 2017, the exotic Asian longhorned tick, *Haemaphysalis longicornis*, is now broadly



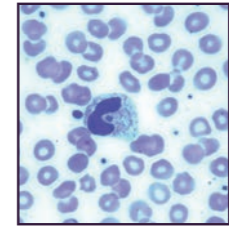
Adult female Asian longhorned tick

established in the eastern and mid-western United States. Established populations of this tick have been found in coastal CT and its distribution is expected to increase. It is native to East Asia and an important livestock pest in Australia and New Zealand. The preferred hosts of the adult tick are white-tailed deer, dogs, cattle, and various other livestock and wildlife. It can feed on humans and is a known vector of several human diseases in its native range. This tick may be found across a diversity of habitats from lawns to tall grassy areas and woodland edges. It can reproduce asexually (without mating) and rapidly build up large numbers.

Lone Star Tick-Associated Diseases & Illnesses

Ehrlichiosis

Human ehrlichiosis associated with the lone star tick is caused by *Ehrlichia chaffeensis* (human monocytic ehrlichiosis or HME), and *E. ewingii*, the agent of granulocytic ehrlichiosis in dogs. Clinical symptoms are non-specific and viral-like appearing a few days to a couple of weeks after the tick bite. They can range



E. chaffeensis in white blood cell

from mild to severe and may include fever, headache, chills, muscle aches, nausea, vomiting, and malaise. Subclinical cases may be relatively common. Patients usually develop leukopenia (lower white blood cell count), thrombocytopenia (lower platelet count) and elevated liver enzymes.

Red Meat Allergy (Alpha-Gal Syndrome)

An allergic reaction to red meat is associated with the bite of the lone star tick. A delayed anaphylaxis to red meat in individuals that previously consumed meat without difficulty appears due to sensitization to galactose- α -1,3-galactose (alpha-gal), a sugar carbohydrate found in mammalian meat such as beef, lamb, pork and mammalian-derived products, but not in humans. After a tick bite, some people may develop antibodies to alpha-gal and can have an allergic reaction upon subsequently ingesting red meat. Alpha-gal is also present in many nonfood sources like certain pharmaceuticals and gelatin. The reaction typically occurs 3-6 hours after consuming the meat and may consist of itching, burning hives, swelling of the throat, and anaphylactic shock, and may also include gastrointestinal symptoms. Cases of this syndrome are steadily increasing with >34,000 cases detected from diagnostic testing for alpha-gal antibodies from 2010-2018.