



Asian Longhorned Tick, an Invasive Tick in the United States

This publication is to inform veterinary, public health, and pest management professionals

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The Asian longhorned tick, *Haemaphysalis longicornis*, is also known as the cattle tick or bush tick. It is native to East Asia: China, Korea, Japan, and well established in Australia and New Zealand. It is also an invasive tick species in the United States (U.S.) (Figure 1).

This tick is a serious pest of livestock and wildlife in several countries (Heath 2016, Guan et al. 2010). If the Asian longhorned tick becomes established in Arizona, it could become a serious threat to livestock, wildlife, and pets (Figure 2).

The tick is an aggressive biter, and a competent vector of *Theileria* spp., parasites that cause benign or non-transforming theileriosis disease in cattle (Heath 2016, Guan et al. 2010). *Theileria* spp. are cosmopolitan tick-borne intracellular protozoan hemoparasites like *Plasmodium* and *Babesia* that cause the destruction of red blood cells. *Theileria* spp. are periodically detected in managed herds and wild ruminants in the U.S. Prominent symptoms in livestock include fever, anemia, weakness, abortion, difficulty breathing, increased heart rate, and lymph node enlargement.

Severe ectoparasitism (high tick burden) (Figure 3) of livestock in the U.S. has been documented, and the feeding effects and blood loss can cause significant impacts on the health of livestock. Infested animals suffer weight loss, anemia, reduced milk production, poor wool quality, and miscarriages.

The first confirmed appearance of this tick species in the U.S. occurred on a pet sheep in New Jersey during 2017. However, re-examination of archived ticks dating back as far as 2010 indicates *H. longicornis* had been present, but misidentified as the rabbit tick *Haemaphysalis leporispalustris* for a number of years. As of October 2, 2018, the tick has been confirmed in nine states, including: Arkansas, Connecticut, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, and West Virginia. This tick species appears to be highly adaptive to a broad range of climates, from tropical to temperate, and utilizes an extremely broad range of host animals.

Within farms, it has been found on cattle, horses, sheep, pigs, and poultry. The ticks have also been found on wild



Figure 1. An adult female Asian longhorned tick, unfed, about 2.3 mm long. Image courtesy of James Gathany / Centers for Disease Control and Prevention.



Figure 2. The Asian longhorned tick can be found on deer and other wildlife, as well as livestock and in-home pets. Arizona cattle are shown here. Image courtesy of Arizona Beef Council.



Figure 3. Asian longhorned ticks can congregate in large numbers on livestock and companion animals. Image courtesy of Tadhg Rainey.

animals, including: bear, deer, fox, opossums, raccoons, hares, rabbits, ferrets, rats, and various birds. Wild animals, especially birds, can support and move ticks across significant geographic areas. In September 2018, a hawk in Virginia exhibiting tremors was confirmed as the first bird in North America found carrying the tick. Finding the tick on wildlife that can move considerable distances, rapidly, has distressing implications regarding potential geographic spread. During October 2018, an Asian longhorned tick was found feeding on a human resident of Connecticut. The tick has been identified on in-home pets including cats and dogs.

The Asian longhorned tick has been collected in a broad range of different habitats including forested areas, pastureland, public parks, and even golf courses.

It is impossible to predict if, how, when, or where the Asian longhorned tick may arrive in Arizona, and what animals could be impacted. Potentially, an infested animal could be transported into Arizona carrying ticks, or an infested wild animal could migrate into Arizona.

This document will provide basic information on the Asian longhorned ticks, and our understanding of Asian longhorned tick biology, ecology and impacts will improve over time.

Biology

The Asian longhorned tick, *H. longicornis*, is a species of Ixodidae hard tick. They are small ticks, measuring about 3 – 4 mm in length as unfed adults. Engorged adults are approximately the size of a pea. Adult and immature Asian longhorned ticks (larvae or nymphs) are reddish-brown color without any distinctive white markings. The mouthparts are short and wide (Figure 4) in contrast to the long, narrow mouthparts found on many other common species of hard ticks in the U.S.

There are two native *Haemaphysalis* species in the U.S., *H. leporispalustris* the rabbit tick, and *H. chordeilis* the bird tick.

The Asian longhorned tick can reproduce sexually, or through an asexual process called parthenogenesis, meaning female ticks can reproduce without a male. The ticks found in the U.S. have all been parthenogenetic so far. Therefore, an introduced single female tick can produce a whole population by herself, and high local densities develop very rapidly.

The Asian longhorned tick is a three-host tick, meaning it uses three separate hosts to complete its development from egg to larva, nymph, and adult life stages. Female ticks lay up to 2,000 eggs over a two to three week period, depending on temperature and humidity. Larvae have six legs and are very small (smaller than a poppy seed). Observers describe fifty or more larval ticks questing in tight clumps, on the top of grass stalks, appearing like seed heads. Once a host

passes, groups rapidly ambush the animal, feed, and drop off to molt (Figure 5, 6, and 7). Nymphs become dispersed in the environment, and then quest for subsequent hosts. Nymphs are about 2 mm in length, and both nymphs and adults have eight legs.

In its native range, this tick primarily overwinters as nymphs or adults (Heath 2016), and both immature and adult stages are documented as overwintering successfully through harsh eastern state winters. Multigenerational ticks have been found in the U.S. states reporting this pest, which leads us to believe that much (if not all) of Arizona has environmental conditions supportive of multiple generations of the tick in a single year.



Figure 4. Close-up of Asian longhorned tick adult female mouthparts. Image courtesy of Andrea Egizi, Monmouth County Tick-borne Disease Laboratory.



Figure 5. Asian Longhorned tick adult (left), nymph (middle), and larva (right). Image courtesy of Manigandan Lejeune, Cornell Animal Health Diagnostic Center.



Figure 6. Asian longhorned ticks on a U.S. dime. The smaller tick (left) is a nymph, the larger one (right) is an adult female. Image courtesy of James Gathany / Centers for Disease Control and Prevention.



Figure 7. Three Asian longhorned ticks are shown: from left, a fully engorged female, a partial engorged female, and an engorged nymph. Image courtesy of Jim Occi / Rutgers University.

Medical concerns

Asian longhorned ticks have been found to carry several pathogens known to cause human illness in other countries, including *Anaplasma*, *Ehrlichia chaffeensis* (Kim et al. 2003), *Babesia* species, severe fever with thrombocytopenia syndrome (SFTS) virus (Zhuang et al. 2018), Russian spring-summer encephalitis, and Powassan virus (Hoogstraal 1981). But it is unknown if this tick will be capable of transmitting existing tick-borne pathogens in the U.S. like *Borrelia burgdorferi*, which causes Lyme disease, or *Rickettsia rickettsia*, which causes Rocky Mountain spotted fever.

So far, **pathogens causing disease in humans have not been detected in the Asian longhorned tick in the U.S.**, but it is important for animal health officials, ranchers, livestock farmers, public health professionals, outdoor enthusiasts, and the general public to be on the lookout for this tick in Arizona.

Tick tips

- Like managing native hard tick species, integrated pest management (IPM) is the best way to control ticks, and protect animals and people from tick bites.

- Examine your animals on a regular basis and conduct daily personal tick checks after working with infested animals or being outside in tick-infested areas.
- Use personal repellents registered to deter ticks. Check this guide to choose a repellent: <https://www.epa.gov/insect-repellents>. Properly apply repellents and follow the use directions carefully.
- Wear permethrin-treated clothing when you are outdoors for extended periods of time in areas at high risk for tick-borne disease transmission.
- Remove ticks with tweezers or a tick puller by slowly pulling the tick out of the skin. If using tweezers, try to grasp the tick as close to the mouthparts as possible. If the body detaches leaving the head embedded, rest assured that your body will expel the tick mouthparts over time. **Avoid irritating (burning, smothering, twisting, etc.) the tick, and do not wait until it drops off naturally.** Wash the wound with an antiseptic after the tick is removed. Kill the tick in rubbing alcohol and store it for six months (in case disease symptoms develop and the tick needs to be identified). If you are removing ticks from an animal (or another person), it is advisable to wear protective nitrile or vinyl gloves.
- Consult your veterinarian for recommendations specific to your situation and animals.
- The Asian longhorned tick may be confused with other tick species. Figure 8 includes images of brown dog tick and Asian longhorned tick mouthparts for comparison.

If you suspect that you have found an Asian longhorned tick:

- Please carefully collect several and place the specimens in ethanol or rubbing alcohol (70% or greater is best).
- Contain preserved ticks into something rigid, like an empty pill bottle, or clean food container to prevent ticks from being crushed.
- Place container in a zipper-type sealable bag, seal, and place into a second zipper-type sealable bag that is then placed into a box container for shipping.
- Send specimens to Dr. Shujuan Li, University of Arizona, MAC, 37860 West Smith-Enke Road, Maricopa, AZ 85138.

Please do not mail ticks in envelopes, or bubble wrap envelopes, automatic mail sorting systems will destroy the ticks.

Please contact Dr. Shujuan (Lucy) Li lucyli@email.arizona.edu or Dr. Dawn H. Gouge (602) 418-5202, dhgouge@email.arizona.edu to notify us that you are sending ticks.

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Figure 8. Left image is the brown dog tick, right image is the Asian longhorned tick mouthparts.

Haemaphysalis longicornis mouthparts are relatively short and wide compared to many common tick species, but appear quite similar to brown dog tick (*Rhipicephalus sanguineus*) mouthparts to the untrained eye. However, the most obvious identifying differences do involve the shape of the mouthparts. Brown dog ticks have an hexagonal basis capituli which extends laterally, whereas *Haemaphysalis* has laterally extended second palp segments. The differences can only be seen under microscopic examination. For the untrained eye this is challenging to differentiate. Unfortunately, mouthparts are sometimes detached when ticks are removed from a host.



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