



# INTRUDER ALERT: LONGHORNED TICK

## WHAT YOU NEED TO KNOW ABOUT THE INVASIVE TICK

### *HAEMAPHYSALIS LONGICORNIS*

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#### KEY FACTS:

- ◆ Native tick in Eastern Asia<sup>1</sup>
- ◆ Invasive tick in Australia and New Zealand<sup>1</sup>
- ◆ Discovered in United States in 2017.<sup>2</sup> Now known to inhabit the US since at least 2010.
- ◆ First detected in New Jersey. Now found in several eastern US states and Arkansas.
- ◆ Three life stages - each seek a host, feed, and drop off.
- ◆ Broad host range. Prefers cattle, sheep and horses.
- ◆ Considerable biting nuisance causing damage and irritation to livestock, humans, companion animals, and wildlife.<sup>3</sup>



*H. longicornis* adult (left), nymph (center), and larva (right).  
(Photo credit: Manigandan Lejeune, Cornell Animal Health Diagnostic Center)

**OTHER NAMES:** Cattle tick (New Zealand); Bush tick (Australia)

**HABITAT:** Meadows and grassy areas near forests

**HOSTS:** Mammals and birds

**BITES HUMANS:** Yes

**VETERINARY IMPORTANCE:** Confirmed transmitter of bovine theileriosis and parasites that cause babesiosis infection in animals.<sup>3,4</sup> Bovine theileriosis can reduce dairy production on cattle farms and occasionally kill calves. The ticks themselves can also cause anemia in sheep and cattle when densities are high.<sup>3</sup>

**MEDICAL IMPORTANCE:** In Asia, field-collected longhorned ticks can harbor pathogens that are also present, or closely related to those found in the US. These include *Anaplasma phagocytophilum*, *Ehrlichia chaffeensis*<sup>5</sup>, *Babesia* species, and Powassan virus<sup>6</sup>. **The capacity of this tick to act as a vector for these pathogens has not been studied.** This species is also considered a possible vector for Thrombocytopenia Syndrome Virus (SFTSV) in China<sup>3</sup>, an emerging infectious disease with a reported human mortality rate of up to 12.0%.<sup>7</sup>

**NOTABLE INFORMATION:** Invasive populations of this species are capable of reproducing without fertilization (i.e., do not require males). This biological feature may be what allows them to spread rapidly and reach high abundance. Males are generally uncommon in invasive populations.



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## **POTENTIAL FOR SPREAD IN THE US:**

- ◆ *It is possible the longhorned tick is more widespread than currently known*

*H. longicornis* was first identified in the US in Hunterdon County, New Jersey, on November 9, 2017.<sup>2</sup> The ticks successfully overwintered<sup>8</sup>, implying the potential for populations to establish regionally. This species has now been reported in numerous locations in New Jersey outside of Hunterdon County, and in other states, with reported sightings in Virginia, West Virginia, and Arkansas. After reviewing archived samples, there is evidence of species presence several years prior to the 2017 identification.



Female longhorned tick on a leaf. (Photo credit: James L. Occi, Rutgers University)

- ◆ **Ability of longhorned tick to feed on wildlife with large home ranges (e.g., deer) increases the potential for it to spread**

In its native range, the longhorned tick is known to feed on a wide variety of vertebrate hosts<sup>1</sup> and invasive populations exhibit similarly broad feeding habits.<sup>9</sup> In the US, this tick has been observed feeding on sheep, goats, horses, and cattle. It has been collected from wildlife including raccoon, opossum, and deer.

- ◆ **Given their cold tolerance, longhorned ticks could potentially expand northward, in addition to the risk of spread southward and westward in the US**

In its native range, this species survives in relatively cold climates, generally overwintering as nymphs or adults.<sup>3</sup> Individuals have been reported as far north as Primorsky Krai, Russia<sup>10</sup>, a region with a similar climate to the northeastern US. Furthermore, both adults and nymphs collected in China can survive at temperatures below -10 °C - evidence that they are well-adapted for cold winters.<sup>11</sup> The effect of cold on invasive populations in Australia and New Zealand is unclear due to relatively warm regional climates. There is a need for further evaluation regarding the thermal tolerances of the invasive population in the US. Genetic studies to determine the most likely source of this introduction may help shed light on the climatic range of the invasive US population.

## **FOR ENTOMOLOGISTS & PUBLIC HEALTH PROFESSIONALS:**

We encourage public health professionals, veterinary entomologists, and other trained professionals throughout the northeastern US to begin monitoring for this invasive tick species, as well as examine historical collections of *Haemaphysalis* species, as the longhorned tick may have been present in the US for some time.

*Haemaphysalis* ticks are small, inornate ticks with eyes absent, festoons present, and with the second segment of the palpi extending laterally beyond the rectangular basis capitulum. Two species of *Haemaphysalis* ticks are native to the US:

- ◆ Rabbit tick, *H. leporispalustris*
- ◆ Bird tick, *H. chordeilis*

Both native *Haemaphysalis* ticks are broadly distributed across the country. A third species native to Central and South America, *H. juxtakochi*, is also occasionally found in the US, likely transported on migratory birds.<sup>12,13</sup>



Closeup of *H. longicornis* adult female mouth parts.  
(Photo credit: Andrea Egizi, Monmouth County Tick-borne Disease Laboratory)

Many of the characters used to distinguish members of the genus *Haemaphysalis* are subjective (relative lengths and shapes), particularly for the immature stages. This makes these ticks difficult to recognize without firsthand experience or access to a reference collection. As a result, DNA barcode identification has been successfully used to identify ticks in this genus.<sup>2</sup>

For those with extensive experience identifying ticks, key features to differentiate adult female *H. longicornis* from native congeners can be found at [neregionalvectorcenter.com/longhorned-tick](http://neregionalvectorcenter.com/longhorned-tick).

**If you believe that you have collected a longhorned tick, please preserve the specimen in ethanol or rubbing alcohol (70% or greater is best).**

Researchers and extension specialists may send the specimen for DNA barcoding to Dina Fonseca at the Rutgers University [Center for Vector Biology](http://www.rutgers.edu/center-for-vector-biology) (180 Jones Ave., New Brunswick, NJ 08901), or to the National Veterinary Services Laboratory (USDA-APHIS) for morphological identification using [Parasite Submission form 5-38](http://www.aphis.usda.gov/parasite-submission-form-5-38).

Members of the public are encouraged to send specimens to one of the tick identification services listed at [www.neregionalvectorcenter.com/ticks](http://www.neregionalvectorcenter.com/ticks).

#### FOR MORE INFORMATION:

- ◆ [Review of the biology and ecology of \*Haemaphysalis longicornis\* Neumann, 1901](#): Dina Fonseca, Andrea Egizi, James Occi, Rutgers University
- ◆ [Haemaphysalis longicornis Detected in the United States](#): Jonathan Sleeman, USGS
- ◆ [Exotic ticks in New Jersey: What are the concerns?](#): Dina Fonseca, Rutgers University
- ◆ [Self-cloning Asian tick causing worry in New Jersey](#): Alvaro Toledo, Rutgers University

#### REFERENCES:

1. Hoogstraal et al. 1968. Review of *Haemaphysalis* (*Kaiseriana*) *longicornis* Neumann (resurrected) of Australia, New Zealand, New Caledonia, Fiji, Japan, Korea, and northeastern China and USSR, and its parthenogenetic and bisexual populations (Ixodoidea, Ixodidae). *J Parasitol.* 54(6): 1197-1213
2. Rainey et al. 2018. Discovery of *Haemaphysalis longicornis* (Ixodida: Ixodidae) parasitizing a sheep in New Jersey, United States. *J Med Entomol.* 55(3): 757-759
3. Heath. 2016. Biology, ecology and distribution of the tick, *Haemaphysalis longicornis* Neumann (Acari: Ixodidae) in New Zealand. *N Z Vet J.* 64(1): 10-20
4. Guan et al. 2010. *Babesia* sp. BQ1 (Lintan): molecular evidence of experimental transmission to sheep by *Haemaphysalis qinghaiensis* and *Haemaphysalis longicornis*. *Parasitol Int.* 59(2): 265-267
5. Kim et al. 2003. Identification of *Ehrlichia chaffeensis*, *Anaplasma phagocytophilum*, and *A. bovis* in *Haemaphysalis longicornis* and *Ixodes persulcatus* ticks from Korea. *Vector Borne Zoonotic Dis.* 3(1): 17-26
6. Hoogstraal. 1981. Changing patterns of tickborne diseases in modern society. *Annu Rev Entomol.* 26(1): 75-99
7. Luo et al. 2015. *Haemaphysalis longicornis* ticks as reservoir and vector of severe fever with thrombocytopenia syndrome virus in China. *Emerg Infect Dis.* 21(10): 1770-1776
8. NJDA 2018. <http://www.state.nj.us/agriculture/news/press/2018/approved/press180420.html> New Jersey Department of Agriculture. Trenton, NJ
9. Tenquist & Charleston. 2001. A revision of the annotated checklist of ectoparasites of terrestrial mammals in New Zealand. *J Roy Soc New Zeal.* 31(3): 481-542
10. Heath. 2013. Implications for New Zealand of potentially invasive ticks sympatric with *Haemaphysalis longicornis* Neumann, 1901 (Acari: Ixodidae). *Syst Appl Acarol.* 18(1): 1-26
11. Yu et al. 2014. Cold hardiness and biochemical response to low temperature of the unfed bush tick *Haemaphysalis longicornis* (Acari: Ixodidae). *Parasit Vectors.* 7(1): 346
12. Keirans & Restifo. 1993. *Haemaphysalis juxtakochi* Cooley (Acari: Ixodidae), a neotropical tick species, found in Ohio. *J Med Entomol.* 30(6): 1074-1075
13. Mukherjee et al. 2014. Importation of exotic ticks and tick-borne spotted fever group rickettsiae into the United States by migrating songbirds. *Ticks Tick Borne Dis.* 5(2): 127-134.