Update on Ticks: 2022

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Ticks – Fast Facts

- Vector Bacterial, Viral, Allergic Syndromes
- Rapidly developing disease profiles
  - Expanded ranges, species and diseases
- Hard shell vs. Soft shell
- Arachnids
- Hunt via Questing
Myth #1 – Ticks are only active in summer.

- Ticks take one to three years to complete their life cycle depending on species and are active all year long.

Myth #2 – Ticks prefer the woods.

- Some tick species such as American Dog Tick and Gulf Coast Tick prefer open habitat such as pasture and field.

Myth #3 – Takes a day to transmit disease.

- The disease transmission time varies depending on tick species, life cycle stage and what the disease is.
First case of Powassan Virus in Ohio detected in Columbiana County

Health care providers along with local health departments and the Ohio Department of Health (ODH) have worked in partnership to confirm the diagnosis.

Thursday, December 23rd, 2021, 8:22 PM EST
By Zach Mesha

The laboratory at the Centers for Disease Control and Prevention (CDC) has confirmed on Thursday that the first case of the Powassan Virus (POW) has been detected in Columbiana County.
Disease Transmission

• Different attachment times for different diseases
• Length of attachment → disease success
• **Anaplasmosis** 12-24 hours needed to transmit
• Powassan Virus – Nymphal Deer Ticks transmitted POW to mice in 15 minutes
• Lyme -> 24hrs (CDC)
• RMSF -> IMMEDIATE???
Ohio Ticks

- Brown Dog Tick
- American Dog Tick
- Black Legged Tick
- Lone Star Tick
- Gulf Coast Tick
- Longhorned Tick

Common ticks found in Ohio
From left to right: blacklegged tick nymph, blacklegged tick female, blacklegged tick male, American dog tick female, American dog tick male, lone star tick female, lone star tick male.

https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/zoonotic-disease-program/resources/tickborne-diseases
American Dog Tick – *Dermacentor variabilis*

Photo Credit: https://tickencounter.org/
Distribution of *Dermacentor variabilis* (American Dog Tick)

Transmits agents that cause:
- Rocky Mountain spotted fever
- Tularemia

American Dog Tick
(*Dermacentor variabilis*)

Adult female

Adult male

Nymph

Larva

https://www.cdc.gov/ticks/geographic_distribution.html
Black Legged (Deer) Tick – *Ixodes scapularis*

Larva

Nymph

Adult Male

Adult Female

Photo Credit: https://tickencounter.org/
Distribution of *Ixodes scapularis* (Blacklegged Tick)

Transmits agents that cause:
- Anaplasmosis
- Babesiosis
- *Borrelia miyamotoi* disease
- Ehrlichiosis
- Lyme disease
- Powassan encephalitis

Map showing the distribution of Blacklegged Ticks in the United States.

**CDC Data 2014**
Reported Cases of Lyme Disease — United States, 2019

2021: 476,000 – 500,000 Cases est. (CDC)

(K. Stafford, ORTS 2021)
Lone Star Tick – *Amblyomma americanum*

Photo Credit: https://tickencounter.org/
Gulf Coast Tick – *Amblyomma maculatum*

Photo Credit: https://tickencounter.org/
Gulf Coast Tick (*Amblyomma maculatum* Koch)

- Long history in the USA (Koch – 1844)
- Associated with Screwworm infestations originally
- Large mouthparts, large damage to host
- Very similar to American Dog Tick in appearance and host range – open areas/meadows/pasture

**Diseases:**
- *Rickettsia parkeri*
- Canine Hepatozoonosis
- Leptospirosis
- Heartwater
- Tick Paralysis

[Link to Gulf Coast Tick](http://entnemdept.ufl.edu/creatures/URBAN/MEDICAL/Gulf_coast_tick.htm)
New Jersey Is Dealing With A Tick Species That Is New To America
Asian Longhorned Tick
*Haemaphysalis longicornis*

Brown Dog Tick
*Rhipicephalus sanguineous*

Photo Credit: https://tickencounter.org/
Disease Transmission? YES

Theileria – similar to Malaria in humans, but affects livestock, primarily cattle.

Protozoal parasite in saliva

RMSF in Laboratory

No approved Veterinary acaricides currently
First detection of human pathogenic variant of *Anaplasma phagocytophilum* in field-collected *Haemaphysalis longicornis*, Pennsylvania, USA

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Abstract

The Asian longhorned tick, *Haemaphysalis longicornis*, an invasive species associated with human pathogens, has spread rapidly across the eastern USA. Questing *H. longicornis* ticks recovered from active surveillance conducted from 1 May to 6 September, 2019 throughout Pennsylvania were tested for rickettsial pathogens. Of 265 ticks tested by PCR for pathogens, 4 (1.5%) were positive for *Anaplasma phagocytophilum*. Sequence analysis of the 16S rRNA gene confirmed two positives as *A. phagocytophilum-*human agent variant. This is the first reported detection of *A. phagocytophilum-*human pathogenic strain DNA in exotic *H. longicornis* collected in the USA.

**KEYWORDS**

*Anaplasma phagocytophilum*, introduced species, tick-borne diseases, ticks
States with confirmed local Asian longhorned tick populations with number of counties in each state.  
(# of confirmed counties / total # of counties)

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<tr>
<th>State</th>
<th>Counties Confirmed</th>
<th>Total Counties</th>
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<td>Virginia</td>
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The New Bad Tick Is Going to Take Over Half the United States, Study Finds

Ed Cara
Yesterday 4:10pm • Filed to: Ticks

https://gizmodo.com/the-new-bad-tick-is-going-to-take-over-half-the-united-1831079855
Potential Spatial Distribution of the Newly Introduced Long-horned Tick, *Haemaphysalis longicornis* in North America

B. K. Roykarn1, S. C. Berkley2, M. E. Galvao3, D. Berkley1, E. J. M. Teul1, D. H. Foley4, B. Nakao1, R. Lawrence1, A. C. Heath5, B. A. T. Peterson1

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Figure 2. Predicted suitable areas for *Haemaphysalis longicornis* across North America. 1, 2, and 3 represent areas that were predicted to be suitable for the establishment of *H. longicornis* in North America by one, two and three models, respectively. Darker areas represent progressively higher agreement between the models.
Correct Removal of a Tick
Tick Control - Personal

Permethrin Treated Clothing
- Purchased
- Self Treat

Repellents – Topical
- DEET
- Picaridin
- IR3535
- Nookatone

CFAES
• 90% of their time off the host.
• 82% w/in 3m of edge on both sides
• Control Invasive Plants
• Decrease deer to 13/sq. mile

CFAES
Create a Tick-safe Zone to Reduce Blacklegged Ticks in the Yard

• Remove leaf litter.
• Clear tall grasses and brush around homes and at the edge of lawns.
• Place a 3-ft wide barrier of wood chips or gravel between lawns and wooded areas to restrict tick migration into recreational areas.
• Mow the lawn frequently.
• Stack wood neatly and in a dry area (discourages rodents).
• Keep playground equipment, decks, and patios away from yard edges.
• Discourage unwelcome animals (such as deer, raccoons, and stray dogs) from entering your yard by constructing fences.
• Remove old furniture, mattresses, or trash from the yard that may give ticks a place to hide.
• Decreased ticks in yard does not correlate with decreased TVD.

The Connecticut Agricultural Experiment Station has developed a comprehensive Tick Management Handbook for preventing tick bites.
The F52 strain was first cultivated from the codling moth *Cydia pomonella* in Austria [26]. Field tests with Met52 resulted in reductions in *I. scapularis* comparable to those achieved with bifenthrin [21].
Valneva and Pfizer Announce Initiation of Phase 2 Study for Lyme Disease Vaccine Candidate

Preventative shot for Lyme disease, developed at UMass Medical School, enters clinical trial

FDA approves investigational new drug application for Lyme PrEP, a pre-exposure prophylaxis to prevent Lyme disease

By Jim Fessenden
UMass Medical School Communications

February 24, 2021

The first human clinical trial of Lyme PrEP, a seasonal shot to prevent Lyme disease, has begun enrolling volunteers to evaluate the safety and pharmacology of the treatment. A pre-exposure prophylaxis developed at MassBiologics of UMass Medical School, Lyme PrEP uses a monoclonal antibody that protects against the disease. Approximately 60 volunteers will be enrolled in the Phase I trial.
Take Homes

• Tick diseases are prevention diseases
• All FOUR Seasons
• New diseases/species/ranges
• Bacterial, Viral, Allergic
• Need a personal plan for safety
• Permethrin Treated Clothes + Repellants
• Companion Animals can break biosecurity
• Proper Removal
• Submit Tick for Testing

CFAES