Update on Ticks: 2022

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THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

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**

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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.

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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 Mosca**

Thursday December 23rd

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.

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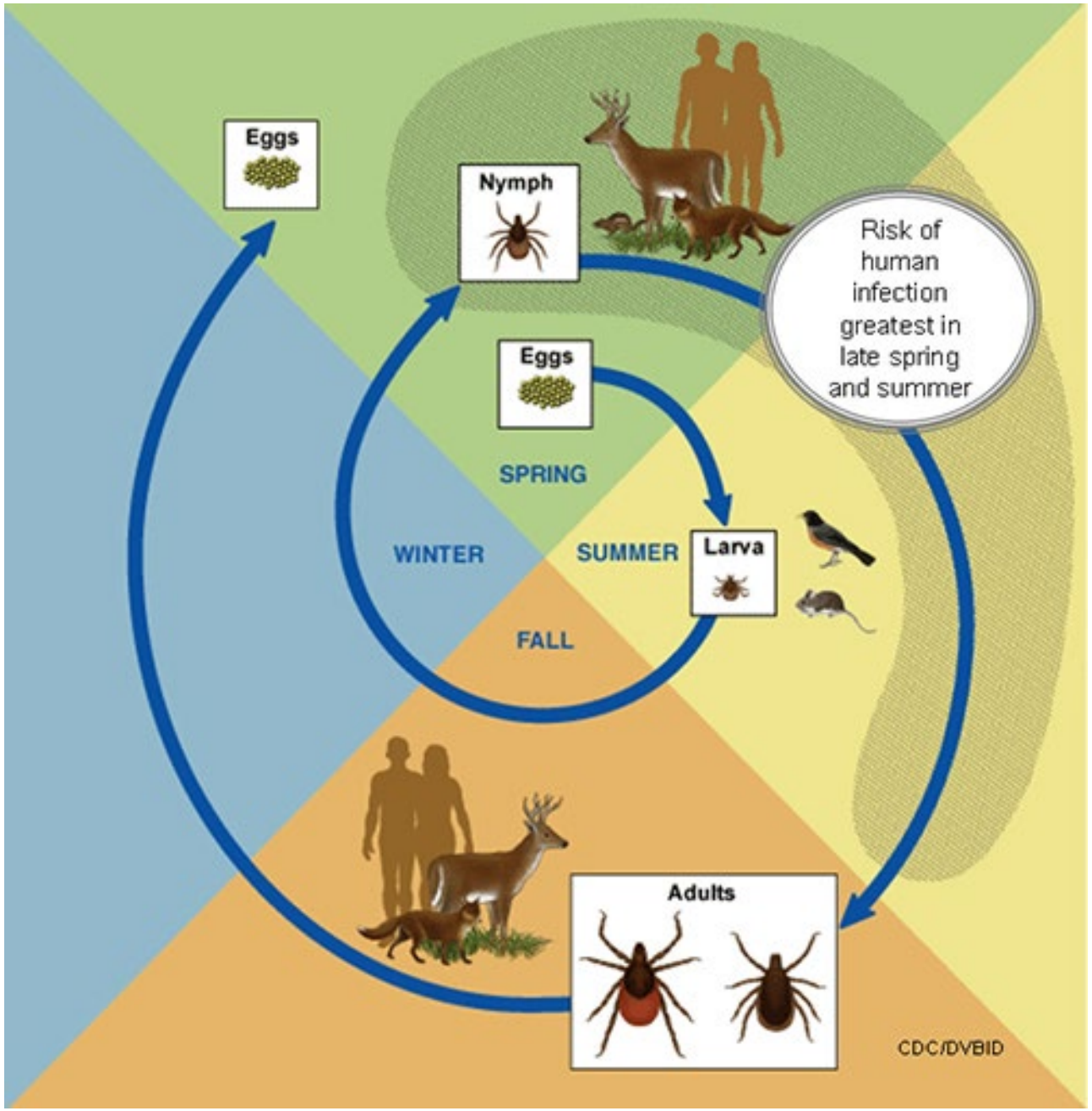
Life Cycle: Deer Tick



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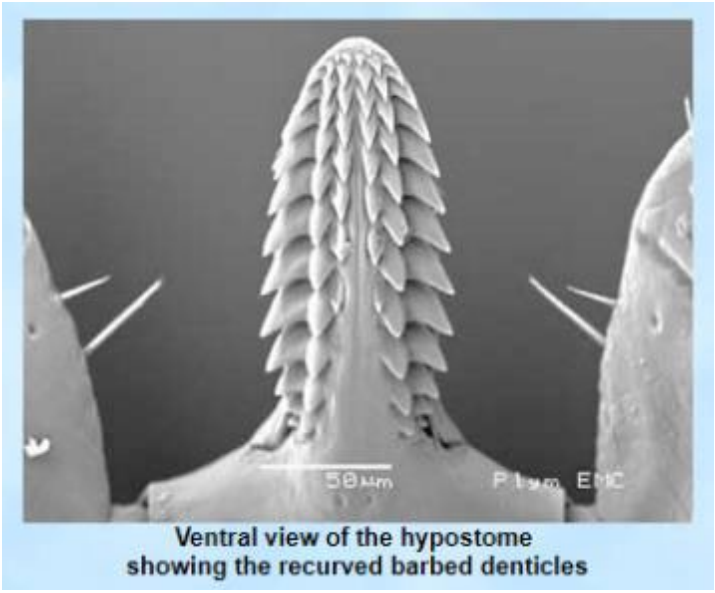
Disease Transmission

- 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???



Ventral view of the hypostome showing the recurved barbed denticles

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Ohio Ticks

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.

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

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https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/zoonotic-disease-program/resources/tickborne-diseases

American Dog Tick – *Dermacentor variabilis*

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Photo Credit: https://tickencounter.org/

Distribution of *Dermacentor variabilis* (American Dog Tick)

Transmits agents that cause:

- Rocky Mountain spotted fever
- Tularemia

Adult female

Adult male

Nymph

Larva

https://www.cdc.gov/ticks/geographic_distribution.html

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Black Legged (Deer) Tick – *Ixodes scapularis*

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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

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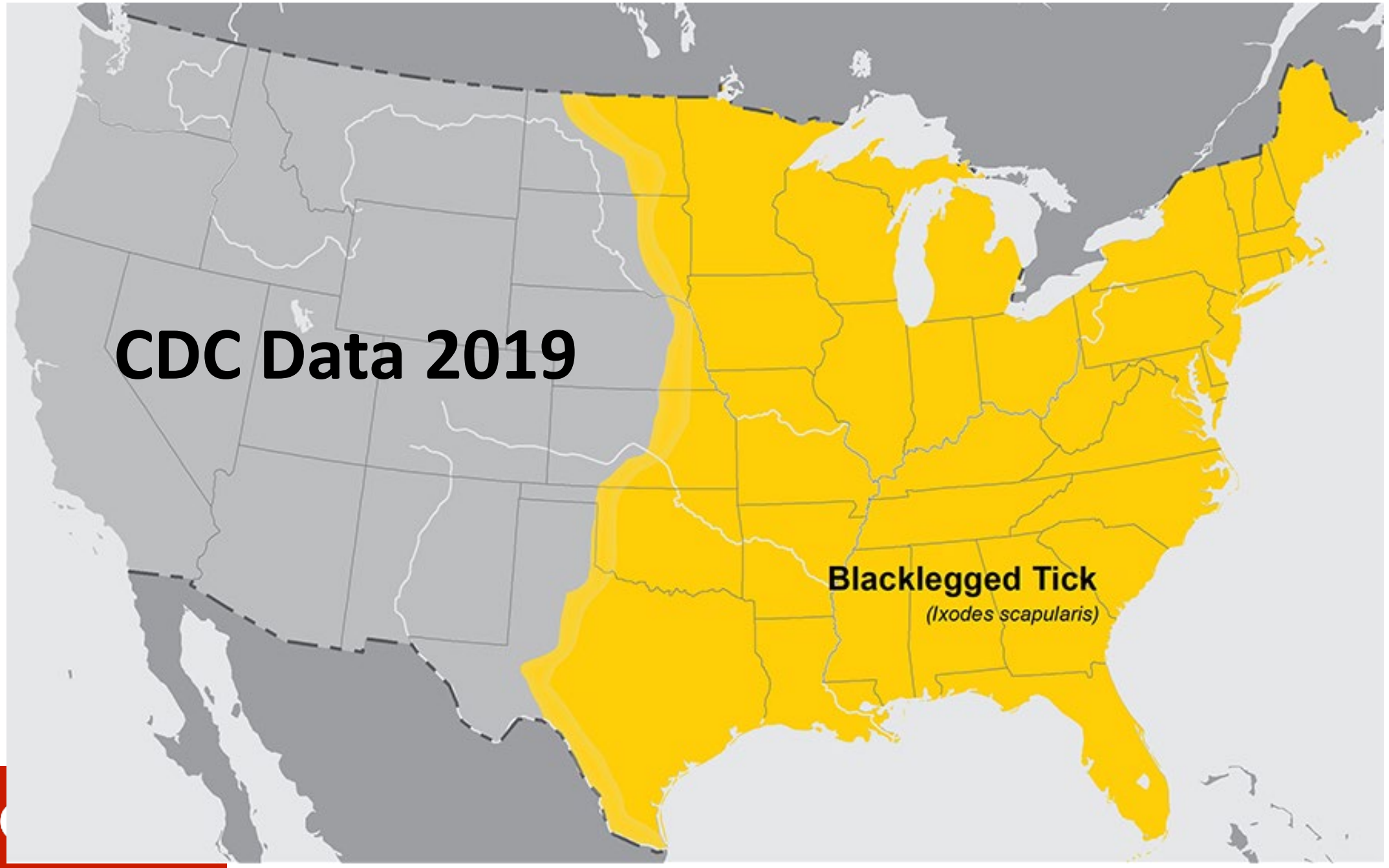
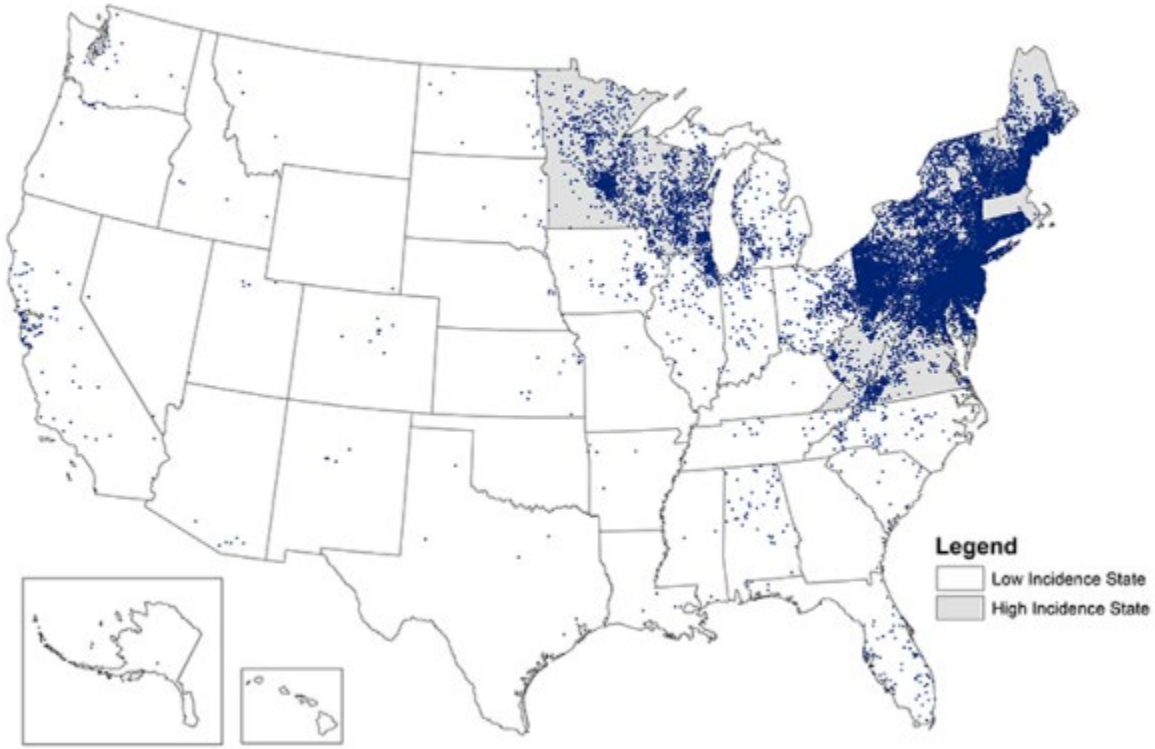
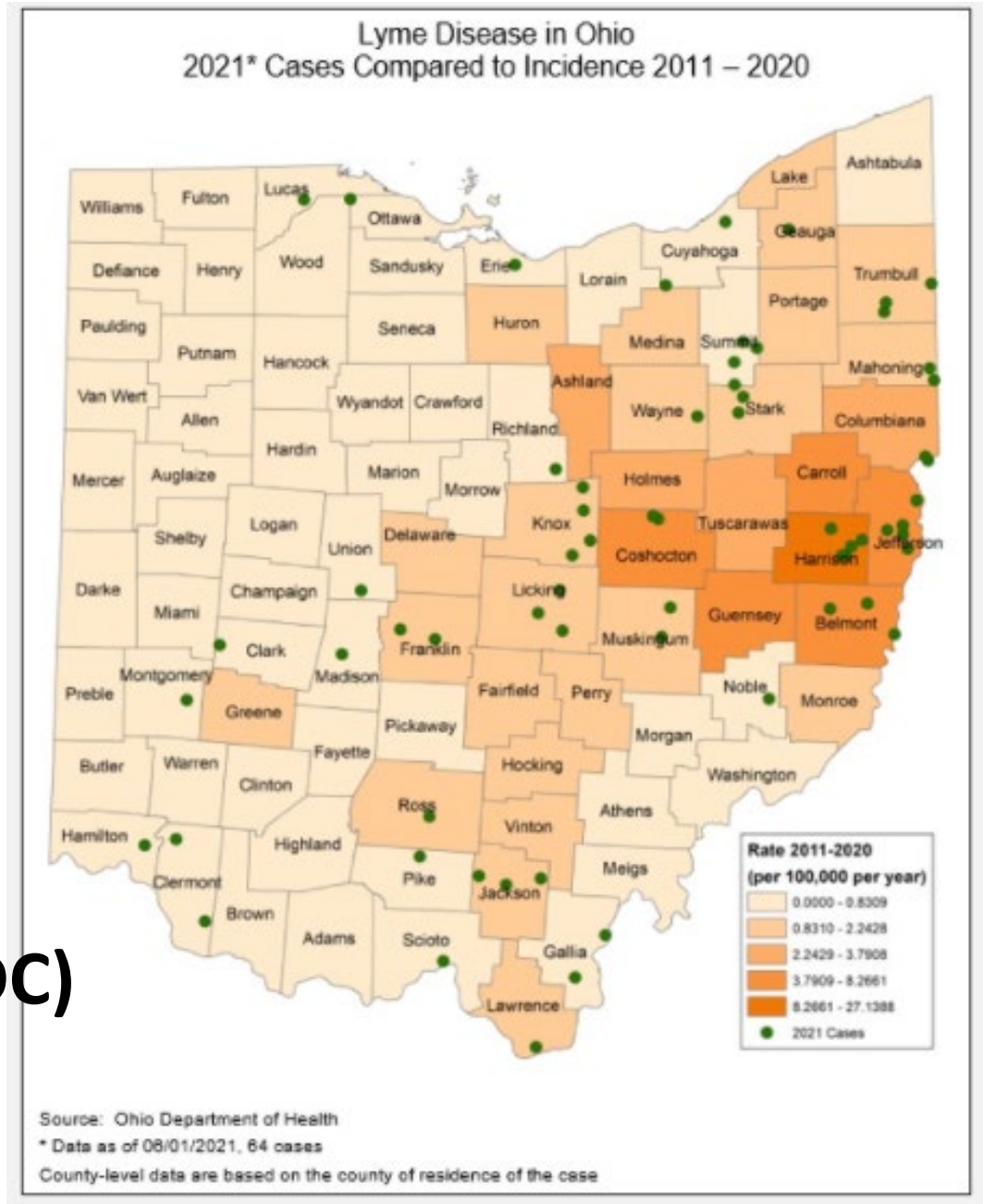
CDC Data 2014


CDC Data 2019
Blacklegged Tick
(Ixodes scapularis)

Reported Cases of Lyme Disease — United States, 2019



1 dot placed randomly within county of residence for each confirmed case



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

(K. Stafford, ORTS 2021)

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Lone Star Tick – *Amblyomma americanum*

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Photo Credit: https://tickencounter.org/

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Gulf Coast Tick – *Amblyomma maculatum*

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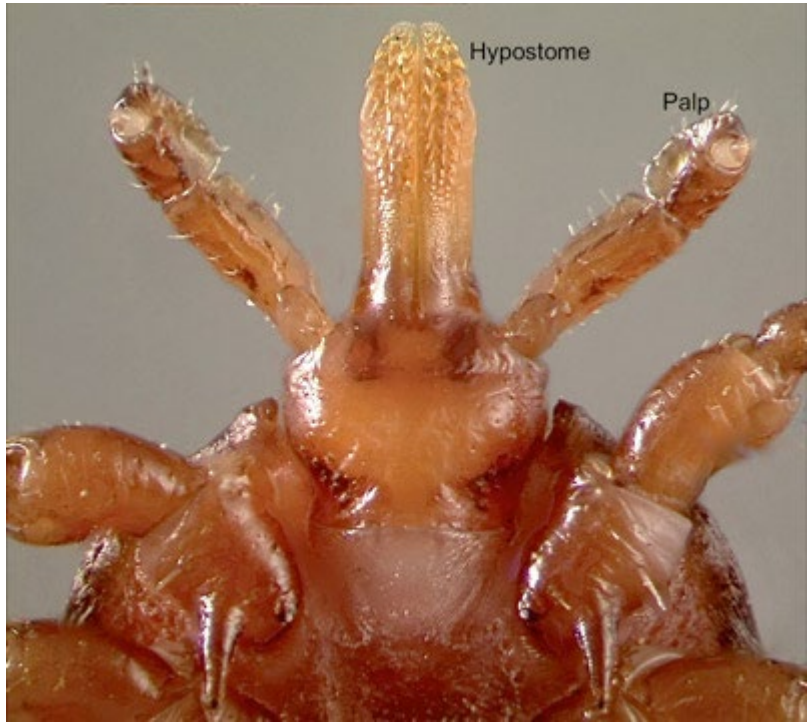
Photo Credit: https://tickencounter.org/

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 – <u>open areas/meadows/pasture</u>

- <u>Diseases:</u>
  - *Rickettsia parkeri*
  - Canine Hepatozoonosis
  - Leptospirosis
  - Heartwater
  - Tick Paralysis



http://entnemdept.ufl.edu/creatures/URBAN/MEDICAL/Gulf_coast_tick.htm

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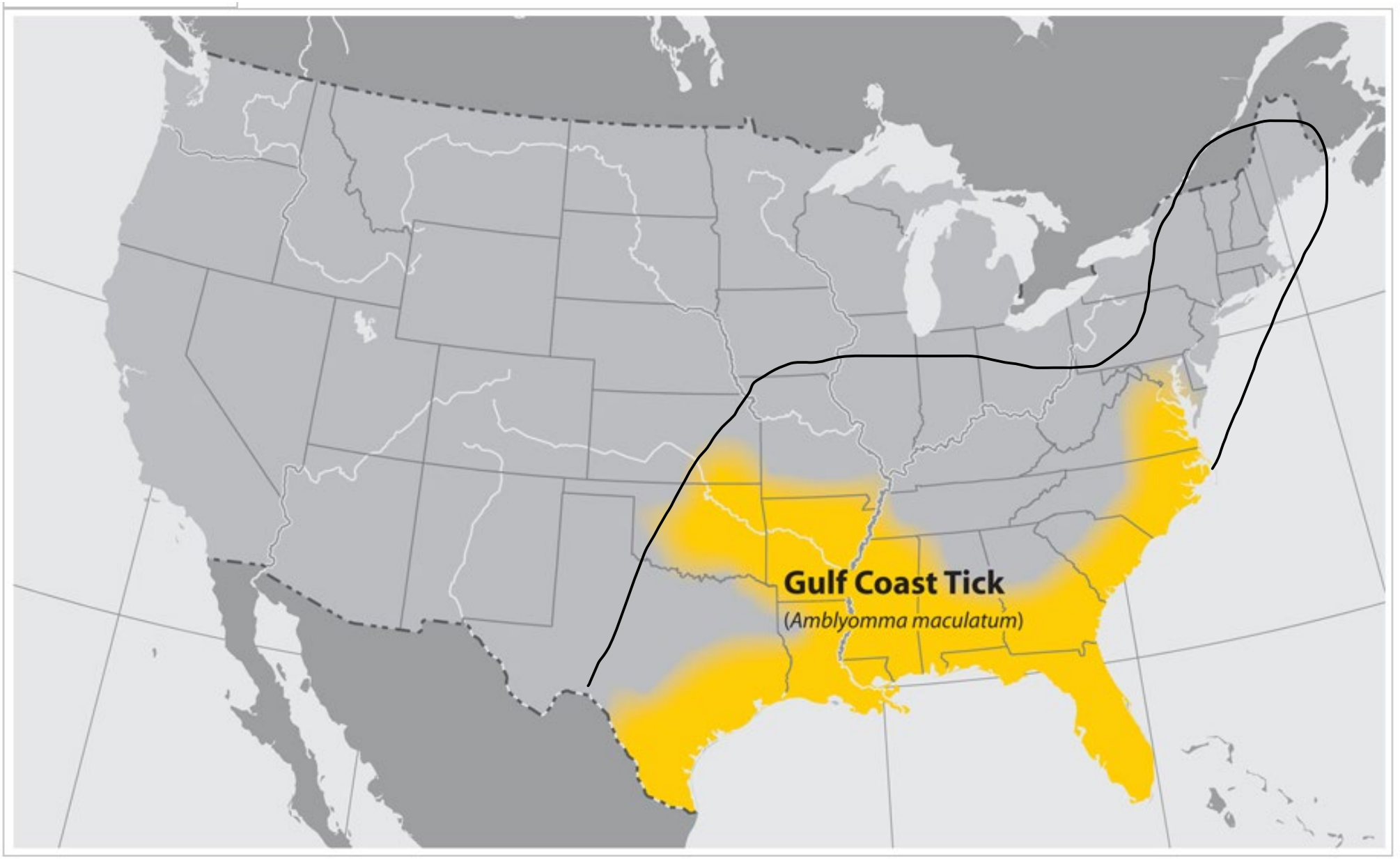
2010



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398,863 views | Apr 21, 2018, 07:11pm

New Jersey Is Dealing With A Tick Species That Is New To America

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Asian Longhorned Tick
Haemaphysalis longicornis

Brown Dog Tick
Rhipicephalus sanguineous

Photo Credit: https://tickencounter.org/

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Disease Transmission? <u>YES</u>

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

Protozoal parasite in saliva

RMSF in Laboratory

No approved Veterinary acaricides currently

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WVDA Confirms Theileria in West Virginia

Bovine Veterinarian News Source

January 28, 2020 03:21 PM

Print

First detection of human pathogenic variant of *Anaplasma phagocytophilum* in field-collected *Haemaphysalis longicornis*, Pennsylvania, USA

Keith J. Price[1] | Bryan N. Ayres[2] | Sarah E. Maes[3] | Bryn J. Witmier[1] | Holly A. Chapman[1] | Brooke L. Coder[1] | Christian N. Boyer[1] | Rebecca J. Eisen[3] | William L. Nicholson[2]

[1]Division of Vector Management, Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania, USA

[2]Division of Vector-Borne Diseases, Rickettsial Zoonoses Branch, Centers for Disease Control and Prevention, Atlanta, Georgia, USA

[3]Division of Vector-Borne Diseases, Bacterial Diseases Branch, Centers for Disease Control and Prevention, Fort Collins, Colorado, USA

Correspondence
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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

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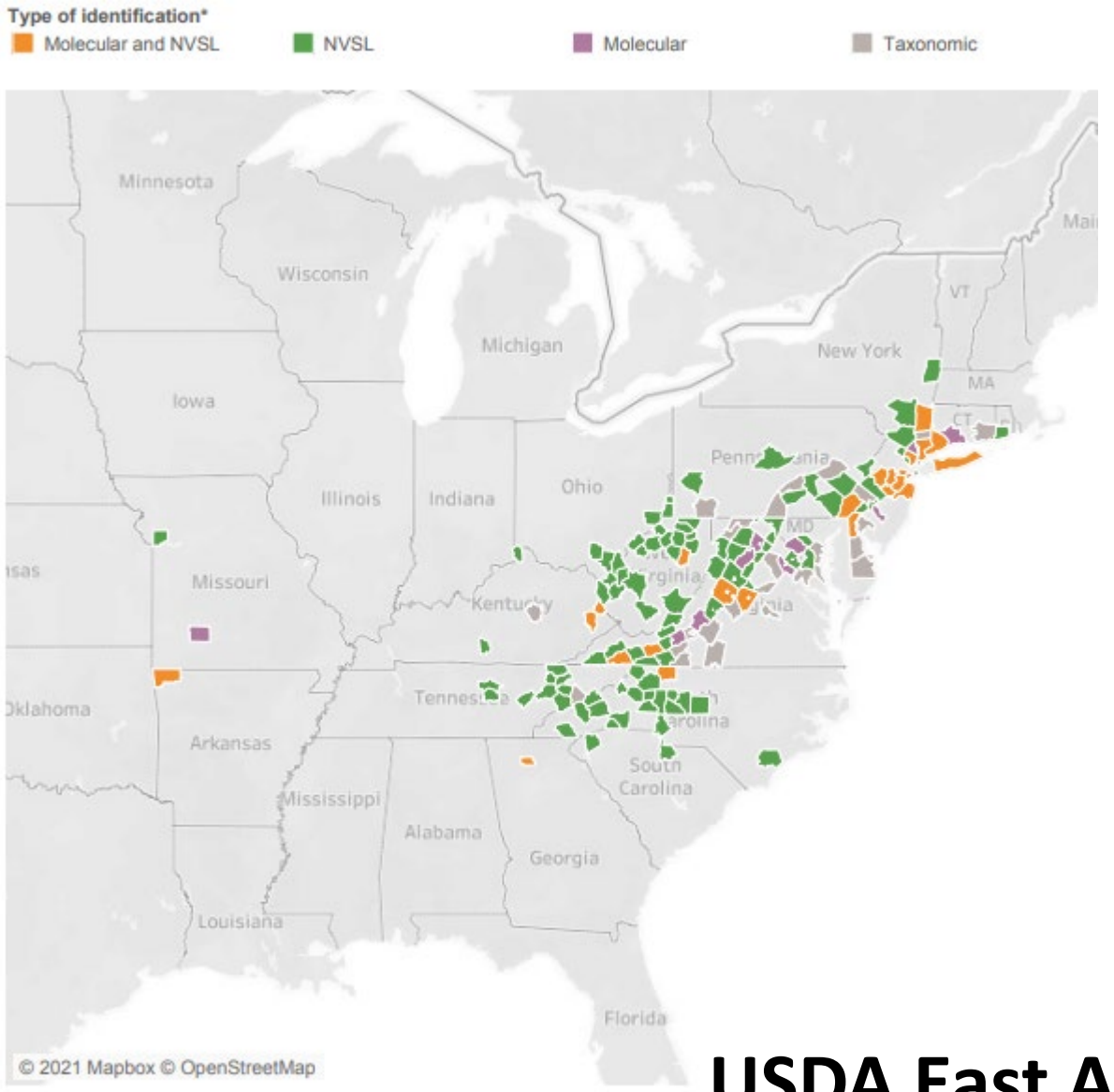
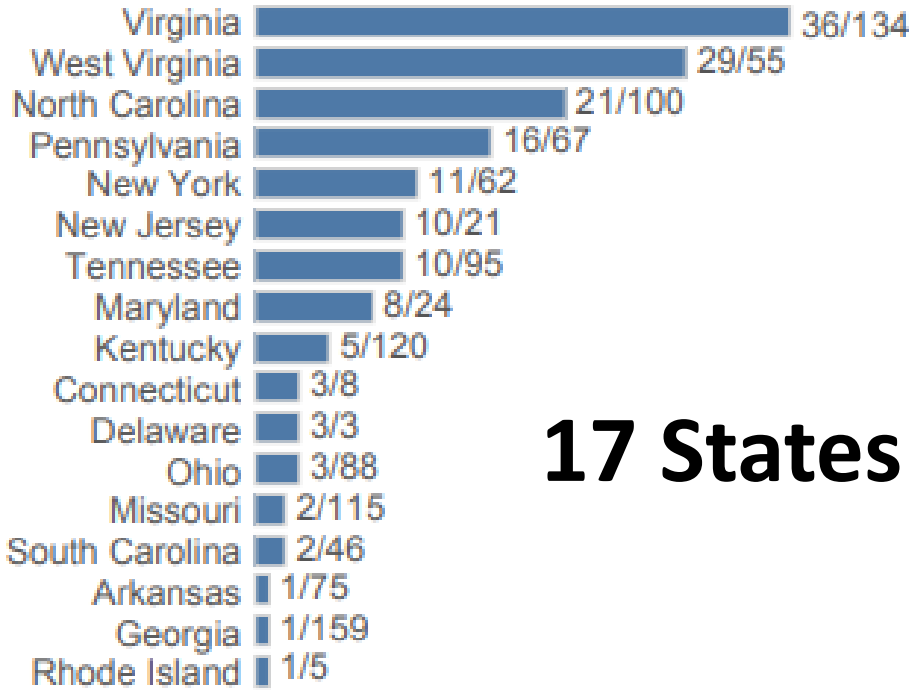


States with confirmed local Asian longhorned tick populations with number of counties in each state. (# of confirmed counties / total # of counties)



17 States

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USDA East Asian Tick Data
January 24th, 2021

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HEALTH

The New Bad Tick Is Going to Take Over Half the United States, Study Finds

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

38.2K 29 Save

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https://gizmodo.com/the-new-bad-tick-is-going-to-take-over-half-the-united-1831079855

https://www.nature.com/srep/

Potential Spatial Distribution of the Newly Introduced Long-horned Tick, *Haemaphysalis longicornis* in North America

R. K. Raghavan[1], S. C. Barker[2], M. E. Cobos[3], D. Barker[4], E. J. M. Teo[1], D. H. Foley[5], R. Nakao[6], K. Lawrence[7], A. C. G. Heath[1] & A. T. Peterson[1]

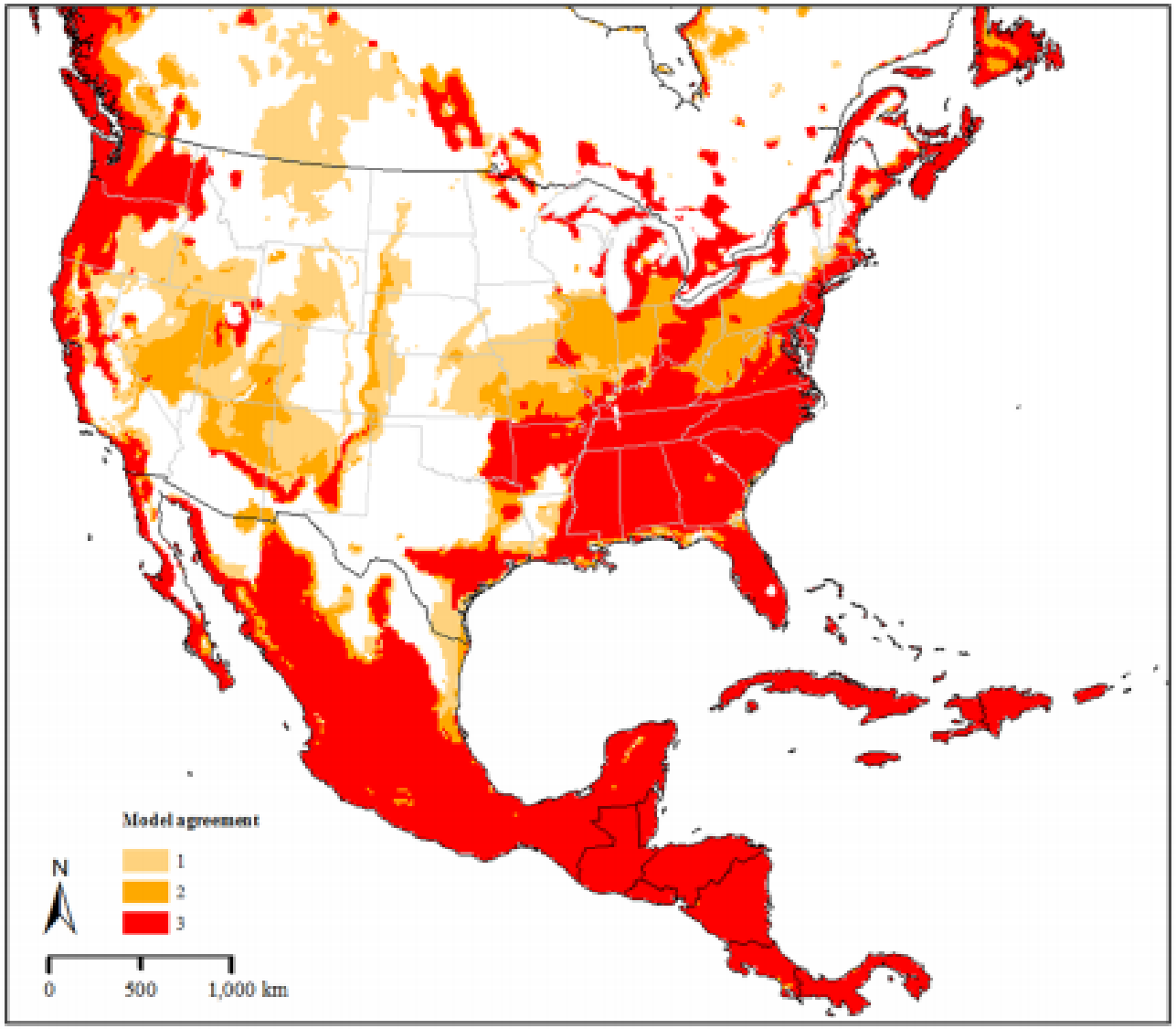

Figure 2. Predicted suitable areas for *Haemaphysalis longicornis* across North America. 1, 2, and 3 represent areas that were predicted to be suitable for the establishment of *H. longicornis* in North America by one, two and three models, respectively. Darker areas represent progressively higher agreement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

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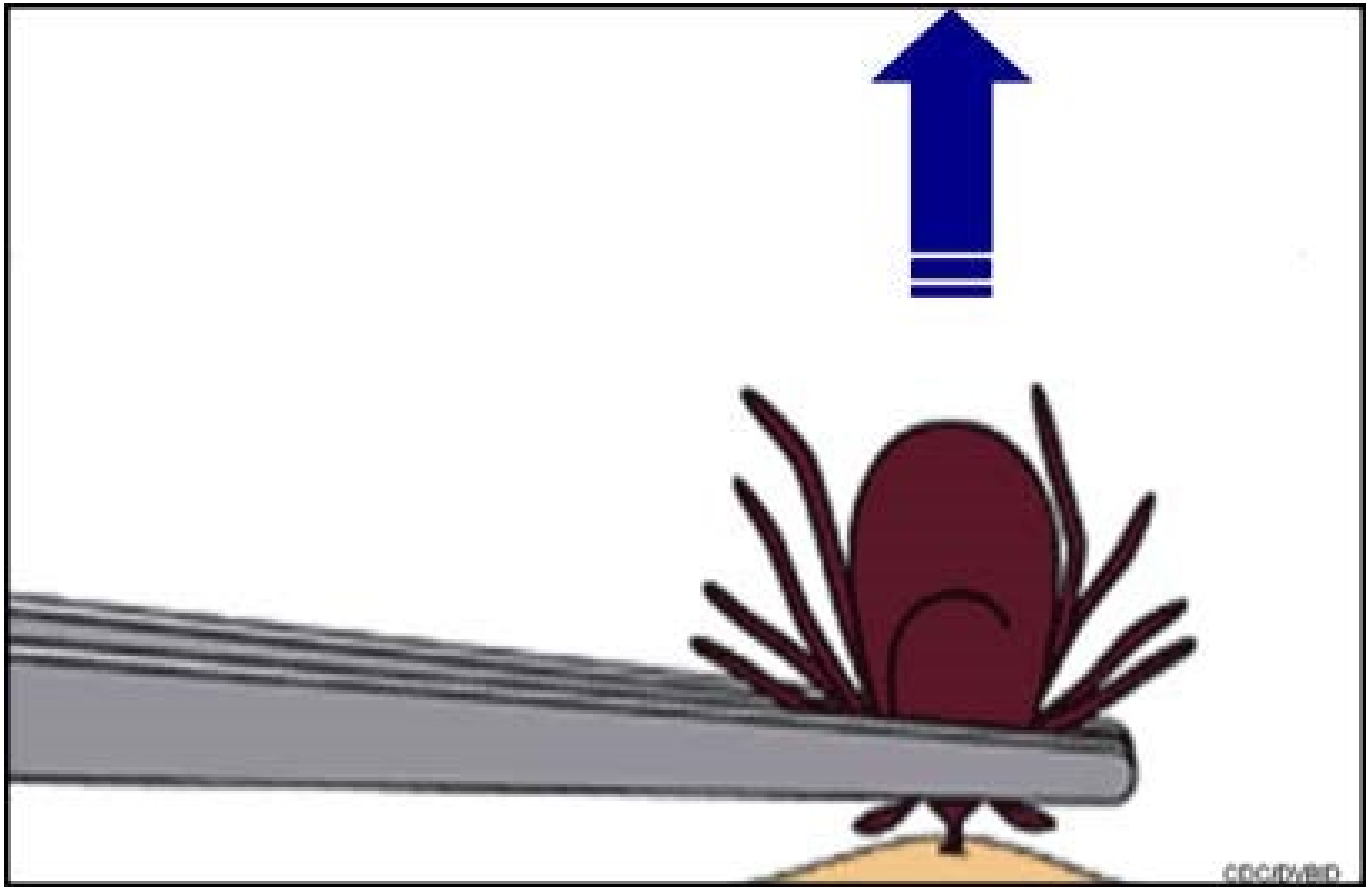
Correct Removal of a Tick



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Tick Control - Personal

Permethrin Treated Clothing

- Purchased
- Self Treat

Repellents – Topical

- DEET
- Picaridin
- IR3535
- Nookatone

Nootka SHIELD™

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2%

- 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

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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.

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The Connecticut Agricultural Experiment Station has developed a comprehensive Tick Management Handbook pdf icon[PDF – 84 pages]external icon for preventing tick bites.

Met52 EC

$64.95 – $164.95

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Safe and effective for use against thrips, fungus gnats, mites and whitefly! Novozymes Met52 EC is a contact bio-pesticide that contains live spores of the insect pathogenic fungus *Metarhizium* anisopliae strain F52 (11.0%). Applied as a soil drench or foliar application it kills listed pest insects with day of harvest.

Note: *Metarhizium anisopliae* is a natura found in soils worldwide. Once the spore penetrate the cuticle or exoskeleton and

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].

Method #1. The Tick Control System®

The "Tick Control System", or TCS®, is a small box that attracts rodents. When an animal enters the box, it receives a low dose of fipronil, the active ingredient in many tick treatments used on dogs and cats. Fipronil kills ticks on animals like mice and chipmunks, which are largely responsible for infecting ticks with the Lyme bacterium.

Method #2. Met52® fungal spray

Metarhizium anisopliae is a fungus that occurs naturally in forest soils in eastern North America and has been shown to kill ticks. A strain of this fungus, Met52, has been developed as a commercial product. It can be sprayed on vegetation where it kills ticks looking for hosts on which to feed.

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valneva

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Lyme Disease – VLA15

Valneva and Pfizer Announce Initiation of Phase 2 Study for Lyme Disease Vaccine Candidate

VLA15 – Valneva's Lyme disease vaccine candidate

- VLA15 is currently the only active vaccine program in clinical development against Lyme disease.
- VLA15 is a multivalent recombinant protein vaccine that targets six serotypes of Borrelia representing the most common pathogenic strains found in the United States and Europe.
- Valneva has completed recruitment and reported initial results for two

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.

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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

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