



TICK BLITZ

Community-Based Science



New York State Tick Blitz Summary 2021 - 2023

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NEVBD

NORTHEAST REGIONAL CENTER FOR
EXCELLENCE IN VECTOR-BORNE DISEASES

Objective

The New York State (NYS) Tick Blitz is a novel program designed to learn more about the presence and distribution of the Asian longhorned tick and the lone star tick in New York State by engaging community volunteers to conduct tick sampling. The NYS Tick Blitz was initiated in 2021 by the Harrington [lab](#), based in the Cornell University Department of Entomology. The program was conducted in collaboration with the NYS Integrated Pest Management [program](#) and the Cornell Cooperative Extension.

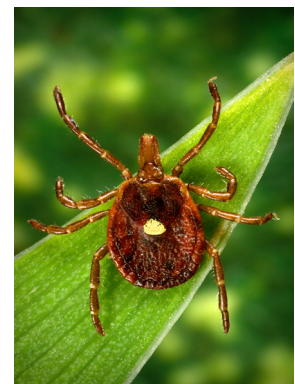
Target Tick Species



Adult female Asian longhorned tick (Photo: CDC)

The Asian longhorned tick (*Haemaphysalis longicornis*) is an invasive species to the United States. It was first detected in New Jersey in 2017¹, and has since spread to 19 other states², including New York. While this tick is associated with spreading disease to humans in its native range, in the US it is mostly considered an issue in the agricultural sector due to its threat to livestock. Understanding the range expansion of this tick is important given its invasive presence and recent introduction in the state.

The lone star tick (*Amblyomma americanum*) is native to the United States³ and its range is expanding northward. The lone star tick can transmit multiple bacteria and viruses to humans; it is also associated with alpha-gal syndrome. While this tick is present in southern New York, surveillance is needed to track its potential northward range expansion.



Adult female lone star tick (Photo: CDC)

1. Rainey, T., et al., Discovery of *Haemaphysalis longicornis* (Ixodida: Ixodidae) Parasitizing a Sheep in New Jersey, United States. *Journal of Medical Entomology*, 2018. 55(3): p. 757-759.

2. USDA. The Asian Longhorned Tick. <https://www.aphis.usda.gov/aphis/maps/animal-health/asian-longhorned-tick>

3. Rochlin, I., A. Egizi, and A. Lindström, The original scientific description of the Lone Star Tick (*Amblyomma americanum*, Acari: Ixodidae) and Implications for the species' past and future geographic distributions. *Journal of Medical Entomology*, 2022. 59(2): p. 412-420.

Methods

Sampling Dates

- 2021: June 13 - June 26
- 2022: June 20 - July 8
- 2023: June 12 - June 23

Count of Volunteers

- 2021: 59
- 2022: 74
- 2023: 83

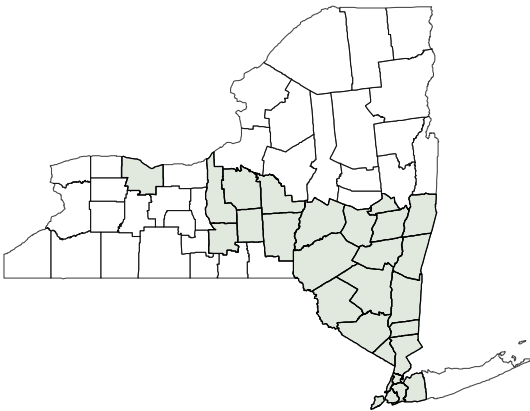
Volunteers were recruited through the Cornell Cooperative Extension (CCE) Master Gardener program, the NYS PRISM network, and Master Naturalist programs; in 2023 volunteers were also recruited from the NY State Parks FORCES program. Volunteers attended either an in-person or Zoom training event covering tick identification, tick habitat, tick bite prevention strategies, and our tick sampling protocol.

Tick sampling occurred in late spring to align collections with the target species' nymphal life stage peak. Participants sampled in suitable habitat for the two target species namely along forest edges and in grassy areas such as open meadows, fields, and pastures. Volunteers were instructed not to sample in wooded areas with leaf litter, as this is prime blacklegged tick (*Ixodes scapularis*) habitat and it was not a target species of this project.

Volunteers dragged in 300-m transects, stopping every 10-m to check the drag for ticks. Data sheets were provided to record GPS coordinates of the collection site as well as habitat data. Ticks were removed from the drag with forceps, contained in a vial, and stored in the refrigerator before being shipped to Cornell University for identification. At Cornell, tick samples were identified to species using taxonomic keys, and life stage was recorded.

Tick Collection Locations

In 2021, 17 counties were targeted for tick collections in the Hudson Valley and New York City regions. In 2022, five additional counties were added further north and west. In 2023, six additional counties were included for a total of 28 counties including the Capital District, Central NY, and the Finger Lakes regions.



Map 1: The 28 counties sampled in 2023 are colored green

Results

In 2021, a total of 3,759 ticks were collected, the majority were the Asian longhorned tick (54%); see Table 1. Fewer ticks were collected in both 2022 and 2023; the Asian longhorned tick accounted for 48% and 41% of total ticks collected, respectively. Overall tick counts were likely reduced in 2022 and 2023 due to drier conditions as compared to 2021.

Ticks outside of our two target species were also collected. A limited number of *Ixodes* ticks and a large number of American dog ticks (*Dermacentor variabilis*) were collected. The American dog tick occupies the same habitat types as the two target species⁴.

Table 1 - Collected Tick Species 2021 - 2023						
	<i>Amblyomma americanum</i>	<i>Dermacentor variabilis</i>	<i>Haemaphysalis longicornis</i>	<i>Ixodes cookei</i>	<i>Ixodes scapularis</i>	Total
2021	405 (11%)	842 (22%)	2031 (54%)	NA	481 (13%)	3759
2022	189 (15%)	178 (14%)	601 (48%)	6 (<1%)	260 (21%)	1234
2023	27 (1.7%)	612 (39%)	647 (41%)	4 (<1%)	275 (18%)	1565

Pathogen Testing

Ticks collected in 2021 were tested for pathogens. The majority (56%) of *I. scapularis* were positive for *Borrelia burgdorferi*, the causative agent of Lyme disease; see Table 2. Of the *A. americanum* tested, one pool was positive for *E. ewingii*, the causative agent of ehrlichiosis. No *A. americanum* were positive for *E. chaffeensis*, Bourbon virus, or Heartland virus. None of the *H. longicornis* were positive for *T. orientalis*, a pathogen of cattle⁵.

Table 2 - <i>Ixodes scapularis</i> Pathogen Testing Results for 2021	
Pathogen	Percent Infected
<i>Borrelia burgdorferi</i>	56.02%
<i>Babesia microti</i>	19.28%
<i>Anaplasma phagocytophilum</i>	13.25%
<i>Borrelia miyamotoi</i>	5.20%
Powassan virus Lineage II	1.97%

4. Stafford KC. American Dog Tick, *Dermacentor variabilis*. The Connecticut Agricultural Experiment Station, 2014. https://portal.ct.gov/-/media/CAES/DOCUMENTS/Publications/Fact_Sheets/Entomology/AmericanDogTickFSpdf.pdf

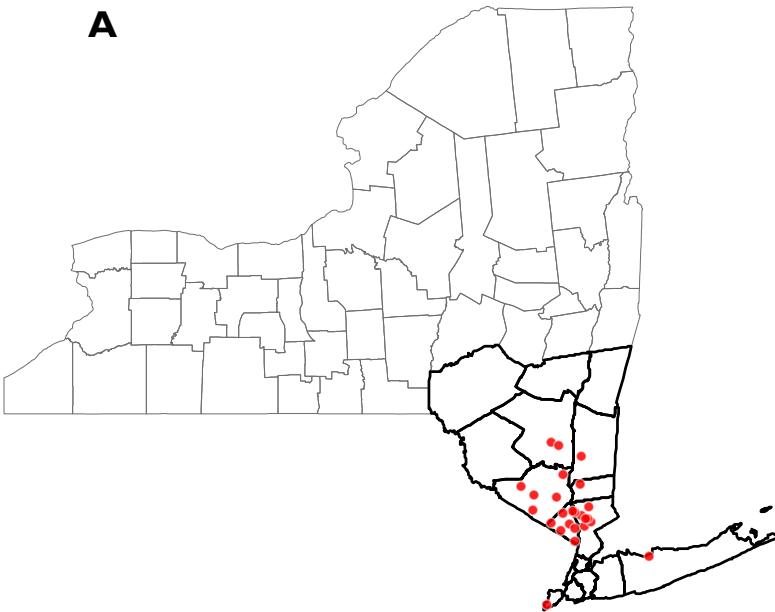
5. Foley N, Balamurali S, Lampman J, Gangloff-Kaufman J, Eastwood G, Cumbie AN, Mader EM, Harrington LC. New York State Tick Blitz: harnessing community-based science to understand range expansion of ticks. *J Med Entomol.* 2023; 60(4):708-717.

Tick Distribution Maps

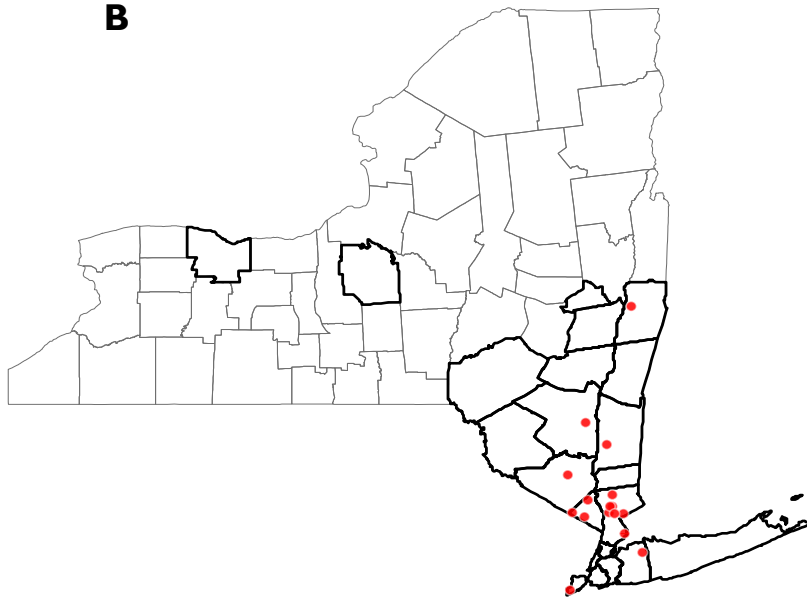
Asian Longhorned Tick (*H. longicornis*)

Three years of collection data show *H. longicornis* is concentrated in the NYC, Long Island, and Hudson Valley regions of the state. In 2021, one *H. longicornis* nymph was collected further north, in Rensselaer County; however, there was limited evidence of further northward expansion of this tick. These data align with the reported range of *H. longicornis* in a recent USDA report⁶.

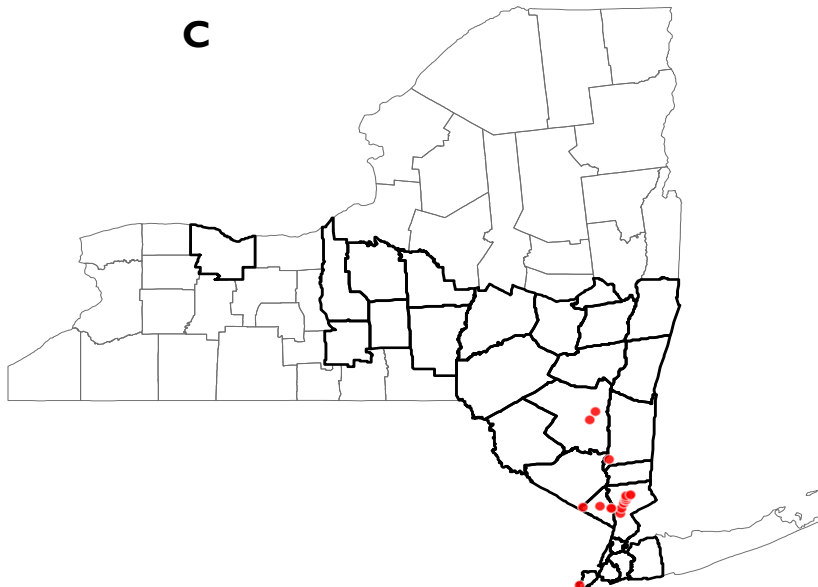
A



B



C



Maps (A) 2021, (B) 2022, and (C) 2023 show locations where *H. longicornis* was collected (red dot). Counties where collections occurred are indicated with a bold outline.

6. USDA. National *Haemaphysalis longicornis* (Asian longhorned tick) situation report. 2023. https://www.aphis.usda.gov/animal_health/animal_diseases/tick/downloads/longhorned-tick-sitrep.pdf

Lone Star Tick (*A. americanum*)

The geographic range of *A. americanum* in New York State is currently limited to the southern portion of the state. In 2021 and 2022, the majority of lone star ticks were collected in Suffolk County on Long Island with additional collections in and just north of the NYC area. In 2023, sampling did not occur in Suffolk County; however, lone star ticks were collected on western Long Island and in the NYC area. No expansion of the *A. americanum* geographic range was noted during the three years of tick sampling from 2021 - 2023. Additional maps can be found [here](#).

A

B

C

Maps (A) 2021, (B) 2022, and (C) 2023 show locations where *A. americanum* was collected (red dot). Counties where collections occurred are indicated with a bold outline.

Surveys

Volunteer Satisfaction Survey

Volunteer demographics were similar for all three years of the program with the majority of volunteers being white, college educated, and 50 years of age or older. When asked about motivations for participating in the Tick Blitz event, in 2021 and 2023 participants most commonly reported they were interested in tick sampling; in 2022, participants reported an interest in learning about tick-borne diseases. At the conclusion of each Tick Blitz event most volunteers reported being likely to participate in the event again.

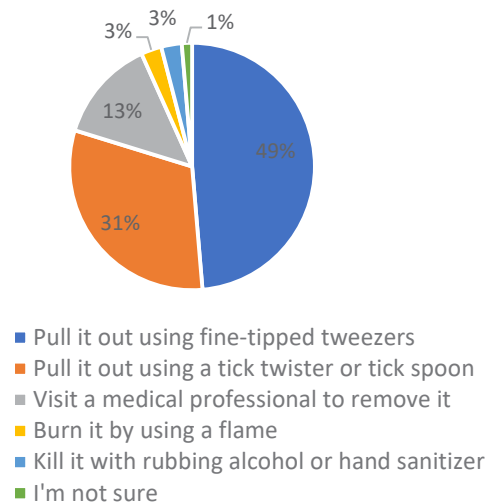
Knowledge, Attitudes, and Practices (KAP)

In 2023, participants were asked to complete two surveys, one before the training session, and one after the training and collection event to measure changes in their knowledge and practices regarding tick bite prevention.

After completing the training, participants were better able to identify the common ticks in the state. When asked to identify the blacklegged tick, the main tick of public health concern in the state, 95% correctly identified the tick post-training compared to 81% pre-training. Before training 80% correctly identified the female lone star tick, compared to 93% after the training. However, there was only a slight improvement in identification of the American dog tick with 76% correct pre-training, and 79% correct post-training.

Understanding of tick bite prevention strategies was already high among volunteers before the training. When asked how to remove an attached tick most participants knew to remove the tick using fine-tipped tweezers (49%) or pull it out using a tick twister or tick spoon (31%). Additionally, 83% reported always performing a tick check after being in tick habitat, walking in the center of the trail (54%), and wearing long pants (67%).

Tick Removal Practices



Conclusion

The NYS Tick Blitz was conducted from 2021-2023. Volunteers were recruited to sample for ticks in their local community. The two target species, *H. longicornis* and *A. americanum*, were collected in the southern region of New York State with limited geographic range expansion noted over the three sampling years.

Ticks collected in 2021 and 2023 were tested for pathogens. In 2021, the majority (56%) of *I. scapularis* were positive for *Borrelia burgdorferi*, the causative agent of Lyme disease. Infection rates among the two target tick species were low with only four *A. americanum* samples testing positive for *E. wingii*, and no *H. longicornis* positive for *T. orientalis*.

Of the participants who completed the survey most reported a willingness to participate in another Tick Blitz event. Improvement in tick identification knowledge was noted along with a high understanding of tick bite prevention strategies.

