Preface: We are pleased to provide this technical report describing initial results from our 2023 tick survey. This report has been written for the Chappaquiddick Island Association and may be shared freely with all interested parties. Submitted October 15, 2023. Questions about the report should be directed to Allison Snow via snow.1@osu.edu or 614-557-2315.
Summary:

The goal of this project was to document the relative abundance of three common tick species on Chappaquiddick Island, Edgartown, MA, to assess current conditions and enable long-term monitoring. We used a standard method of drag-sampling along public hiking trails at five wooded sites, five open sites, and one edge site to quantify tick abundance in June 2023. We found that the three tick species differed in habitat use, similar to previous studies. We report tick densities (number collected per 0.5 km of trail) for comparisons with future surveys.

Nymphs of blacklegged ticks (*Ixodes scapularis*; also known as “deer ticks”) were common at wooded study sites, averaging ~60-70 nymphs per 0.5 km of trail. Blacklegged ticks can carry pathogens causing Lyme disease, babesiosis, and anaplasmosis.

Lone star ticks (*Amblyomma americanum*) became established on Chappaquiddick by 2015 and are now a major problem. Lone star nymphs and adults were most abundant at wooded sites, where they were almost as numerous as blacklegged nymphs. We found clusters of lone star larvae at two of the wooded sites. Blacklegged and lone star ticks had combined densities of ~100-120 ticks per 0.5 km of trail at wooded sites. Lone star nymphs and adults also occurred in open fields and were common at the edge site. Possible health threats from lone star ticks include acquiring the alpha gal syndrome (red meat allergy), along with other illnesses.

Dog ticks (*Dermacentor variabilis*) were common in open fields, presumably due to the presence of skunks and raccoons, and were rare at the edge and wooded sites. Dog ticks very rarely carry human disease pathogens in New England. However, occasional cases of tularemia have occurred in Chilmark, Martha’s Vineyard, where dog ticks with the tularemia pathogen have been reported.

Overall, these findings can be used in discussions of strategies for mitigating tick-related illness on Chappaquiddick and Martha’s Vineyard. We plan to carry out similar surveys in 2024 and 2025 to examine year-to-year variation in the ticks’ distribution and abundance.
1. INTRODUCTION

Understanding the ecology of ticks is useful for anticipating and mitigating tick-related illness. In southern New England, ticks and tick-borne diseases are common in coastal communities that have high densities of white-tailed deer and blacklegged ticks (*Ixodes scapularis*, “deer ticks”). Some of these areas also have been invaded by lone star ticks (*Amblyomma americanum*), leading to escalated health concerns about additional tick-borne diseases and the alpha-gal “red meat” allergy syndrome (Molaei et al. 2019; CDC 2023a). Dog ticks (*Dermacentor variabilis*) are another common tick species that has been implicated in occasional outbreaks of tularemia on Martha’s Vineyard (Goethert et al. 2009). These tick species have three active life stages, as larvae, nymphs, and adults, and they require a blood meal at each stage. In southern New England, exposure to blacklegged tick bites occurs primarily in early summer (Piesman et al. 1987), which is the peak activity period for blacklegged nymphs, lone star nymphs and adults, and adult dog ticks seeking blood meals. In contrast, adult blacklegged ticks seek blood meals in spring and fall, and therefore were not included in this study.

The goal of this project was to document the relative abundance of these three tick species on Chappaquiddick Island, Edgartown, MA (Figure 1), using methods similar to recent surveys of ticks on Nantucket and Tuckernuck islands (Snow et al. 2023). Lone star ticks were first reported to be reproducing on Chappaquiddick by Richard Johnson in 2015, after being noticed infrequently since 1985 (Vineyard Gazette 2015 a,b). Currently, lone star ticks are most abundant on Chappaquiddick and Aquinnah, and they are gradually becoming more common across the interior of Martha’s Vineyard (Figure 2, personal communication from Patrick Roden-Reynolds and Richard Johnson). Over the long term, it will be useful to know whether the invasion of lone star ticks is correlated with a decrease in the abundance of blacklegged ticks, as some investigators have observed anecdotally on Long Island, NY (Sanchez-Vicente et al. 2019). Results from the current study can serve as a baseline for comparisons with future surveys of the relative abundances of all three tick species on Chappaquiddick.
Figure 1. Map of Chappaquiddick Island in the town of Edgartown, Mass. Upland area estimated in Appendix 1.

Figure 2. Maps of lone star occurrence on Martha’s Vineyard based on yard surveys in 2019 and 2022 (courtesy of Patrick Roden-Reynolds and Richard Johnson).
2. METHODS

2.1 Study site selection

The upland area of Chappaquiddick is about 4.4 sq miles, excluding Cape Poge and barrier beaches, and the island has many accessible conservation areas and public trails (Figure 1; Appendix 1, 2). Study sites were selected at five open sites, one edge site, and five wooded sites (Figures 3 and 4; Table 1, Appendix 3). Prior to sampling, research permits were obtained from the Sheriff’s Meadow Foundation, the Martha’s Vineyard Land Bank, and The Trustees of Reservations. We chose sites where public hiking trails were available for dragging a 1 m$^2$ cloth along the trail edge to sample ticks. The distances sampled along each trail were ~300-700 m (Table 1). Open sites, which are referred to as “meadows”, included grasslands and early successional old fields where the trail consisted of mowed grass. The single edge site in this study, at Tilghman Landing, was a mowed, grassy trail next to woods and separated from adjacent fields by tall shrubs. At wooded study sites, only trails that had leaf litter present were used. This requirement excluded many Land Bank trails, which typically are about 2 m wide and cleared of leaf litter on a regular basis. We used one Land Bank trail as a wooded study site, designated here as Three Ponds. In mid-June the Land Bank staff kindly deferred clearing leaf litter from this section of trail so sampling could continue for another two weeks. We did not use the open, burned area at Wasque Point as a study site because no ticks were collected there during preliminary sampling. Also, we did not attempt to sample ticks on Cape Poge due to the difficulty of getting there.

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Figure 3. Locations of 11 study sites on Chappaquiddick.

Figure 4. Examples of open, edge, and woods habitats.
2.2. Vegetation surveys

We conducted vegetation surveys to record common woody species at each site and to characterize the extent of shade. Observations were recorded at regular intervals of ~10-15 m along each trail. For each observation point, we noted woody species that were present within a 1 m radius of both sides of the trail edge, as well as the presence of branches over the trail as an index of shade. These data are reported as the percent of observation points with each species present or with branches overhead, respectively. Tree species that were present as small saplings in wooded sites or as brush-cut “shrubs” in open and edge sites were not distinguished from mature trees. Scarlet oak (*Quercus coccinea*), if present, may have been overlooked and grouped with black oak (*Q. velutina*). Non-woody species were simply noted as “grasses and forbs.” For the open and edge sites, we recorded whether trees or shrubs that were >2 m tall were present along the edge of the trail in the 1 m radius for each observation point to document the proximity of shady habitat adjacent to the trail.

2.3. Tick sampling

To quantify tick abundance, we used a common drag sampling method that involved dragging a white cotton cloth over known distances and checking for ticks at regular intervals, as in Snow et al. (2023). Questing ticks cling to the drag cloth and are easily removed with silicone putty or a lint roller for counting. Many questing ticks are likely to remain uncaptured after a single drag sweep and a large fraction of the total population is not expected to be questing at any given time. Nonetheless, sampling ticks with drag cloths is a widely accepted protocol for estimating relative densities (i.e., the number of ticks collected per distance sampled).

A 1 m$^2$ piece of white, rubberized flannel cloth with small lead weights sown into the distal corners was dragged slowly over leaf litter, grass, and/or low vegetation along the edge of the trail and checked every 12 m, when ticks were removed from the drag cloth and counted. We also counted the number of drag sweeps with clusters of at least 50 lone star larvae. At sites where the section of available trail was less than ~300 m and where the trail was greater than 1 m wide, we drag-sampled for ticks on both sides of the trail (without overlap). These sites included Brine’s Meadow, Wasque Meadow, Hardy Meadow, and Landing Edge. Sample distances listed in Table 1 represent sampling along both sides of the trail at these sites.
Drag sampling was carried out between May 30 – June 23, 2023. Quantifying the densities of questing ticks is challenging due to a great deal of variation from day to day and even different times of day. Sampling was carried out when the vegetation was dry, typically before noon and after 1500 hrs to avoid mid-day heat on sunny days. Previous studies have shown that lone star ticks often quest during drier periods of the day than blacklegged ticks (Schulze and Jordan 2003), so early afternoon sampling was included at study sites with lone stars. We sampled each site five times, with at least two days between visits, and alternated the order and times of day when each site was sampled. Tick densities are reported as the average number of ticks per 0.5 km of trail to allow comparisons among sites. These averages are based on five sampling dates for every site except Slater Woods, where only four sampling dates were used (the last date was unusable because maintenance staff had cleared leaf litter off the trail). We did not attempt to distinguish between blacklegged nymphs (Ixodes scapularis) and morphologically similar nymphs of Ixodes dentatus, which were probably rare or absent based on previous collections on Nantucket (Snow et al. 2023).

Representative samples of Ixodes nymphs (N = 625), lone star nymphs (N = 619), lone star adults (N = 340), and dog tick adults (N = >400) were frozen, transferred to the UMass Laboratory of Medical Zoology, and saved for possible pathogen testing at a later date. These DNA analyses also would show whether any Ixodes dentatus were collected along with blacklegged nymphs.

3. RESULTS

3.1. Shade index and common plant species across sites

As intended, open sites and the Landing Edge site had a very low shade index, while wooded sites were predominantly shaded (Figure 5). Although open sites were exposed to full sun, portions of these trails had trees or tall shrubs growing along the edge of the trail (Figure 6). At four open sites, about 20% of the trail had trees along the edge, while Cove Meadow had almost no trees. At Brine’s Meadow, 18% of the trail had tall shrubs along one side, near Brine’s Pond. At the Landing Edge site, trees and tall shrubs predominated along one or both sides of the entire trail (Figure 6).

The five wooded sites were dominated by oak-pine, oak-hickory, or oak-sassafras tree species (Appendix 4). White oak (Quercus alba), black oak (Q. velutina), scrub oak (Q. ilicifolia), and pitch pine (Pinus rigida) were the
most common species. Slater Woods and Tilghman Woods stood out as having few pitch pines, while Packard Woods had very few white or black oaks. Common understory species at all wooded sites included black huckleberry (*Gaylusaccia baccata*), beaked hazelnut (*Corylus cornutus*), viburnum (*Viburnum species*), and poison ivy (*Toxicodendron radicans*). Other common species at the 11 sites are listed in Appendices 5 and 6.

**Figure 5.** Shade index showing percent of trail with branches overhead at each study site.

![Shade index](image)

**Figure 6.** Percent of the trail with tall shrubs or trees alongside at 5 open sites and 1 edge site.

![Percent of trail with tall shrubs](image)
3.2. Tick abundance across sites

Blacklegged ticks
Nymphs of blacklegged ticks were rare or absent at the five open sites and the edge site, and common at all five wooded sites (Figure 7a). Nymph densities averaged 60-70 per 0.5 km of trail at four wooded sites and were lower at Three Ponds Woods (44 per 0.5 km). Across all dates at the five wooded sites, we found only 26 blacklegged adults compared to a total of 1,531 blacklegged nymphs.

Lone star ticks
Lone star nymphs and adults were found at all 11 study sites and were most common in or near wooded sites (Figure 7b). Densities of lone star nymphs were greatest at four wooded sites and Landing Edge, with ~30-50 per 0.5 km. In contrast, at Three Ponds Woods the average density was only 15 lone star nymphs per 0.5 km. Two of the open sites, Handy Meadow and Brine’s Meadow, had densities of 21-24 nymphs per 0.5 km, exceeding the density found at Three Ponds Woods. Lone star nymph densities were lowest at Cove Meadow, Wasque Meadow, and Quammox Meadow.

Lone star adults were most common at Packard Woods (32 nymphs per 0.5 km), followed by Slater, Tilghman, and Mytoi Woods. At the open sites, Wasque Meadow had the most lone star adults (9 per 0.5 km). Across all 11 sites, 46% of all lone star adults were females (N=410). A total of 9 larval clusters of lone stars were found at Packard Woods and 3 were found at Mytoi, while none were found at the other sites.

Combining data for lone star nymphs and adults, it is noteworthy that densities at Landing Edge were as high as those at the three wooded sites with the greatest densities (Mytoi, Slater, and Packard, all with >50 per 0.5 km; Figure 7b). At four wooded sites, the combined densities of blacklegged nymphs and lone star ticks (nymphs and adults) were >100 per 0.5 km, and nearly half were lone stars (Figure 8).

Dog ticks
Dog ticks were rare at Landing Edge and the five the wooded sites. Their densities varied across the five open sites (Figure 7c). The greatest density of dog ticks was at Cove Meadow, especially along the last third of the trail where a single 12 m sweep sometimes captured >50 dog ticks. Dog ticks were fairly common at Wasque Meadow and Handy Meadow, and were less common at Brine’s Meadow and Quammox Meadow.
Figure 7a. Average density of **blacklegged nymphs** per 0.5 km of trail.

Figure 7b. Average density of **lone star ticks** per 0.5 km of trail.

Figure 7c. Average density of **dog ticks** per 0.5 km of trail.
Figure 8. Average density of all ticks per 0.5 km of trail, showing dog ticks, lone star ticks (LS) and blacklegged nymphs (BL).

4. DISCUSSION

4.1. Habitat use and abundance of each tick species

Two major findings of this survey are that the three tick species differed in habitat use, consistent with other studies (Mathisson et al. 2022), and that blacklegged nymph abundance was relatively high, exceeding that of lone star densities at wooded sites. Blacklegged nymphs were largely restricted to wooded sites and dog ticks to open sites, while lone star ticks occurred at all sites and were most common in the wooded sites and Landing Edge.

Information about tick densities is essential for tracking changes in their abundance over time. We found that densities of blacklegged nymphs in wooded habitats were remarkably similar to those found on Nantucket Island in 2020-2022 (Table 2), while densities of lone star ticks were lower than those found on Tuckernuck Island in 2020-2022 (Table 3). Based on the data available so far, no evidence suggests that the establishment of lone star ticks on Chappaquiddick is coinciding with or causing a major reduction in the abundance of blacklegged ticks, as postulated by Sanchez-Vicente et al. (2019). Instead, it appears that these two species may be able to coexist on Chappaquiddick.
Blacklegged ticks, lone star ticks, and dog ticks differ in their use of drier, sunnier environments and in the wildlife hosts that they feed on at each life stage. Many studies have shown that blacklegged nymphs require shady habitats with leaf litter that provides a humid microenvironment for their survival (Mathisson et al. 2022). A possible reason for lower blacklegged nymph density at Three Ponds Woods could be that this Land Bank trail had less leaf litter along the edges than trails at the other four wooded sites. Lone star ticks are known to be more tolerant of desiccation than blacklegged ticks, so it is not surprising that they use a wider range of habitats. Dog ticks also are able to tolerate dry conditions of open grasslands and old fields.

The larvae and nymphs of blacklegged ticks feed mainly on small rodents, shrews, chipmunks, rats, other small mammals, ground-foraging birds, as well as deer, all of which are common in wooded habitats, while adults feed primarily on deer (references in Snow et al. 2023).

All three life stages of lone star ticks feed mostly on deer, which are frequently seen in all habitats on Chappaquiddick and favor the borders between woods, shrublands, and open fields. In addition to deer, lone star ticks are known to feed on other mammals, wild turkeys, and quail (Kollars et al. 2000, Ferreira et al. 2023).

Unlike blacklegged and lone star ticks, dog ticks do not typically feed on deer (e.g., Goethert et al. 2009). Adult dog ticks thrive in open habitats and their abundance on Chappaquiddick may be related to the availability of skunks for their final blood meal. Dog tick larvae and nymphs feed on white-footed mice, voles, and possibly rabbits, while adults feed on skunks and raccoons, both present on Chappaquiddick, as well as dogs that have not been treated with acaricides. Skunks often

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forage for grubs in lawns, golf courses, parks, and on beaches, especially where compost and food scraps are available (Johnson 2016). They can forage over distances exceeding 1-2 km in a single night (Greenwood et al. 1997). We observed skunks foraging at Cove Meadow, where dog ticks were most common, and also at other locations.

4.2. Limitations of this study

June is typically within the peak period of abundance for blacklegged nymphs, lone star ticks, and adult dog ticks (for example, see Figure 9), but they also are active in other months, as are adult blacklegged ticks. Therefore, findings from this study do not represent the year-long relative abundance of each species. Nonetheless, focusing on their abundance during the month of June is an efficient way to monitor their habitat use and relative frequency within this peak time frame, similar to published studies by other investigators.

Figure 9. Schematic diagrams of peak encounter risk in New England for the ticks we surveyed, adapted from TickEncounter, University of Rhode Island. Note that ticks are often active earlier and later than shown in these diagrams. [Link to https://web.uri.edu/tickencounter/fieldguide/ticks-by-species/]

Another limitation of the sampling design is that only five sites were sampled to characterize open vs. wooded habitats, and only one edge site was included. Tick abundances were fairly consistent across four of the five wooded sites, but dog tick and lone star abundances differed among the five open sites. Ideally, it would be helpful to carry out
quantitative sampling in more open and edge sites. The yard surveys that Patrick Roden-Reynolds and Richard Johnson have carried out over the past several years provide a valuable complement to the trail surveys reported here.

4.3. Health risks associated with each tick species

Because all three tick species are common on Chappaquiddick, the types of health risks that they pose are described briefly below. More information on tick-borne diseases is available at CDC (2023b).

Blacklegged ticks

Blacklegged nymphs represent a well-known danger because they carry the disease agents that cause Lyme disease, babesiosis, anaplasmosis, along with less common pathogens like Powassan virus (e.g., Snow et al. 2023 and references therein). In Massachusetts, most cases of tick-borne disease occur due to bites from nymphs in the summer months, with additional cases occurring at other times of year when adult blacklegged ticks are most active.

Although infection levels for blacklegged nymphs from Chappaquiddick have not examined, we assume that they are similar to the range of values reported for Martha’s Vineyard by Sam Telford III. These two islands have similar habitats and wildlife species, and they are often connected by a barrier beach. On Martha’s Vineyard, Telford found that 12% vs. 22% of blacklegged nymphs were infected with the Lyme pathogen in 2020 vs. 2021, respectively, along with 10% vs. 20% for babesiosis, and 10% vs. 5% for anaplasmosis (N = 585, 683 nymphs in each year; personal communication to AAS). Similarly, in a previous study on Nantucket, we found that 10% vs. 19% of blacklegged nymphs were infected with the Lyme pathogen in 2020 vs. 2021 (Snow et al. 2023). Coinfections with the pathogen for babesiosis occurred in about 40% of nymphs that tested positive for the Lyme pathogen on Nantucket, posing an elevated health risk (Snow et al. 2023).

Lone star ticks

Bites from lone star ticks can cause some people to acquire the alpha gal red meat allergy, which has become a growing problem on Martha’s Vineyard and elsewhere in recent years (CDC 2003a). Lone stars also can carry disease agents for tularemia, ehrlichiosis, heartland virus disease, and infection with Borrelia lonestari, but not Lyme disease (Molaei et al. 2019). Infection frequencies for lone star nymphs and adults are not well
documented in southern New England and may be quite low (Snow et al. 2023). Further studies of infection prevalence for lone star ticks from coastal Massachusetts are needed, especially now that this species is becoming more common.

On Chappaquiddick, it is hard to avoid being exposed to lone star ticks because they often occur in residential areas, grasslands, shrublands, and wooded habitats. Their ubiquity, fast-moving behavior, and irritating bites constitute a great source of anxiety for many people, in addition to the chance of developing an allergy to red meat. We found lone star larvae at two of the wooded sites, indicating that females had successfully laid eggs that had hatched prior to the June sampling period. Far more clusters of lone star larvae, sometimes known as “tick bombs” or “hives”, are expected to be present on Chappaquiddick later in the summer (e.g., Telford et al. 2019; personal communication from Patrick Roden-Reynolds), when hundreds of swarming larvae may bite an unlucky person’s ankles or legs. Lone star females can lay as many as 4,000-5,000 eggs before they die.

**Dog ticks**

Dog ticks are probably unlikely to transmit disease agents to people on Chappaquiddick, but the remote possibility of acquiring tularemia is noteworthy. Tularemia is caused by a bacterium (*Francisella tularensis*) that is associated with dog ticks and other hosts, and its epidemiology is not well understood (Matyas et al. 2007). Martha’s Vineyard is known for having more cases of tularemia than other parts of the USA. In 2004-2007, about 3% of dog ticks sampled at a known “hot spot” in Chilmark (Squibnocket) tested positive for DNA from *F. tularensis* (Goethert et al. 2009). However, these authors note that it is not clear whether ticks that test positive for DNA from *F. tularensis* can actually infect people. Also, it is not known whether similar infection levels for *F. tularensis* occur in dog ticks from other areas of the Vineyard (Goethert et al. 2009).

Most cases of tularemia have been associated with inhalation of airborne particles encountered by landscape workers, possibly derived from infected dead rabbits, rather than being linked to bites from infected dog ticks (Matyas et al. 2007, Goethert et al. 2009). Therefore, Patrick Roden-Reynolds has recommended wearing high-quality N95 masks and goggles when mowing grass and clearing brush to avoid possible airborne exposure to *F. tularensis* (Roden-Reynolds et al. presentation, 2023). In some areas of the USA, dog ticks also carry the disease agent that causes Rocky Mountain Spotted Fever, but in Massachusetts the proportion of dog ticks that have tested positive for this pathogen is extremely low (e.g., no positives were detected in 3,240 ticks submitted to TickReport in 2018-2023; [https://www.tickreport.com/]).
4.4. Conclusions and future plans

Obtaining rigorous data on tick abundance is challenging due to the many variables that affect their survival, reproduction, and questing activity, but major changes in abundance should be detectable with the protocols used here. Ideally, data on tick abundance could be paired with data on infection levels to determine whether the risk of exposure to tick-related illnesses has changed over time.

To examine the extent of year-to-year variation, we plan to repeat the survey of tick abundance on Chappaquiddick in 2024 and 2025 (pending approval of each site’s property owner). In addition, it would be helpful to know more about the range of habitats where lone star ticks occur, perhaps by adding a few more study sites in open and edge areas. The semi-quantitative yard surveys that have been carried out by Richard Johnson and Patrick Roden-Reynolds (Figure 2) are a valuable resource for examining where and when each tick species is found in people’s yards in spring and summer. In contrast, our current data are limited to four weeks in late May and June. Examining results from this study in the context of their island-wide yard surveys of all three species will give a more complete view of tick abundance and associated health risks over the course of the year.

Multiple-year monitoring can provide a baseline for determining the effects of possible wildlife interventions and for examining natural changes in tick-borne disease transmission cycles, such as the possible arrival and persistence of coyotes. Researchers at MIT have proposed releasing thousands of genetically engineered mice that are resistant to the Lyme spirochete on Martha’s Vineyard and Nantucket (Buchthal et al. 2018, Snow 2019). If their project moves forward, results from surveys on Chappaquiddick and elsewhere will be useful for examining the effects of such interventions. Long-term data on tick abundances also can help determine whether the invasion of lone star ticks is correlated with a decline in blacklegged ticks, as some researchers have suggested anecdotally (Sanchez-Vicente et al. 2019). In closing, we appreciate the interest that Chappaquiddick residents and others have shown in this survey and welcome further discussions going forward.

ACKNOWLEDGMENTS

Foundation, Martha’s Vineyard Land Bank, and Trustees of Reservations for helpful advice and assistance. This research was funded by the UMass Laboratory of Medical Zoology and the Emeritus Academy of Ohio State University.

APPENDICES (see separate document)

1. Map for estimating upland area of Chappaquiddick.
3. GPS coordinates for study sites.
4. Common tree species at wooded study sites on Chappaquiddick.
5. Common plants at wooded study sites on Chappaquiddick.
6. Common plants at open and edge study sites on Chappaquiddick.
7. Maps of sampled trails at each study site.
KEY REFERENCES AND RESOURCES

(available on request from Allison Snow)

** indicates highly relevant


Johnson, L. The behavioral ecology and population characteristics of striped skunks inhabiting piping plover nesting beaches on the island of Martha's Vineyard, Massachusetts. 2016, Doctoral dissertation, Antioch University.


MVBOH (Martha’s Vineyard Board of Health) guide to ticks,  https://www.mvboh.com/identify


**Roden-Reynolds, P., and E. McGintee. MVTV recording of presentation on lone star ticks and alpha gal. April 14, 2023. [https://mvtv.vod.castus.tv/vod/?video=7cdf4b47-8c69-4292-b26f-8c81b12de0f9&nav=search%2FLone%20star](https://mvtv.vod.castus.tv/vod/?video=7cdf4b47-8c69-4292-b26f-8c81b12de0f9&nav=search%2FLone%20star)**

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**Snow, A. A., P. Pearson, G. Xu, D. N. Allen, R. Santamaria, and S. M. Rich.** Tick densities and infection prevalence on coastal islands in Massachusetts, USA: establishing a baseline. *Insects* 2023, 14: 628. [https://doi.org/10.3390/insects14070628](https://doi.org/10.3390/insects14070628)


