**Title**: *Ixodes scapularis* nymphal survival and host-finding success in the Eastern United States

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**Abstract**

The blacklegged tick (*Ixodes scapularis*) is the primary vector of *Borrelia burgdorferi*, the Lyme disease agent in North America. The basic reproduction number (*R*0) for some tick-borne pathogens is highly sensitive to the probability that engorged larvae survive the winter (*sN*), molt into nymphs, and find a host (*c*). This process is dependent on local environmental variables, including climate, host population size and movement, and tick behavior. We estimated host-finding success (*c*) and host density via mark-recapture trapping of the primary host, *Peromyscus leucopus*, at two sites on Block Island, RI and two in mainland Connecticut by measuring the abundance of nymphs on hosts in year 2016 and comparing it to the abundance of larvae found on hosts in 2015, taking into account overwintering survival. Overwintering survival (*sN*) was estimated using engorged larvae placed in field enclosures at each location. Survival did not differ significantly between regions, but host-finding success was higher in mainland Connecticut compared to Block Island. Estimating tick overwintering survival (*sN*) and the probability a surviving tick successfully finds a host (*c*)separately allowed for assessments of regional variation in different elements of the Lyme disease system. These calculations contributed to understanding the nuanced effects on tick physiology from those on tick questing behavior and the effects of climate from those of host populations. Characterizing such relationships will eventually allow for more reliable predictions of Lyme disease risk in new regions or those undergoing ecological change.

**Title**: Aversion of the invasive Asian longhorned tick to a small mammalian host, the white-footed mouse

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**Abstract**

The Asian longhorned tick (*Haemaphysalis longicornis*) was reported for the first time in the United States in 2017. The potential of this newly invasive vector to transmit pathogens and its host preference in the US is currently unknown. Host preference determines the pathogens a vector can transmit and is therefore crucial for pathogen emergence and spread. For example, the white-footed mouse (*Peromyscus leucopus*) is the primary vertebrate reservoir host in the US for the causative agent of Lyme disease. We used a laboratory behavioural assay to determine the host preference of larval *H*. *longicornis* and compared this with the behaviour of larval black-legged ticks (*Ixodes scapularis*). We find larval *H*. *longicornis* show an aversion to the hair of white-footed mice. Furthermore, these ticks actively leave a potential host when placed directly on a white-footed mouse. In contrast, larval *I*. *scapularis* attach at the site of placement and subsequently engorge. We propose the aversion of *H*. *longicornis* to mice might be due to mice developing resistance to this tick species. Acquired tick resistance reduces the fitness of ticks so host aversion might have been selected for in *H*. *longicornis*. Host aversion is an overlooked factor in pathogen transmission studies.