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# Effects of Environmental Factors on the Abundance of Blacklegged Ticks

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## Effects of Environmental Factors on the Abundance of Blacklegged Ticks

Sponsor: Howard Ginsberg (USGS Patuxent Wildlife Research Center, Coastal Field Station)

The most significant environmental factors that influence measurements of *Ixodes scapularis* abundance varied, based on the particular location of the ticks sampled. Ticks were most abundant on hosts when there were relatively large numbers of available hosts. In contrast, questing ticks (ticks in leaf litter) were most abundant in environments with dense canopy cover and high relative humidity in the leaf litter. These results support previous studies that found tick abundance and survival to be greatest in forest habitats with high humidities (Maupin et al. 1991, Ginsberg & Zhioua 1996, Berger et al. 2014).

Our results suggest that when studying transmission of pathogens between ticks and hosts, researchers should sample ticks directly from hosts, rather than sampling host-seeking ticks from the leaf litter.

When sampling ticks to evaluate human risk of tick bite, environmental factors such as canopy cover and relative humidity should be taken into account. People are most likely exposed to potentially infected nymphal ticks in areas with moist leaf litter and thick canopy cover. Host-seeking *Ixodes scapularis* nymphs are most abundant in these conditions. These results help explain why studies have shown greatest risk of Lyme disease when residential areas are near forest habitats (Guerra et al. 2002, Jackson et al. 2006).

### References:

- Berger, K.A. et al. 2014. Adverse moisture events predict seasonal abundance of Lyme disease vector ticks (*Ixodes scapularis*). *Parasites & Vectors* 7:181.
- Ginsberg, H.S. & E. Zhioua. 1996. Nymphal survival and habitat distribution of *Ixodes scapularis* and *Amblyomma americanum* ticks (Acari: Ixodidae) on Fire Island, New York, USA. *Exp. Appl. Acarol.* 20:533-544.
- Guerra, M. et al. 2002. Predicting the risk of Lyme disease: habitat suitability for *Ixodes scapularis* in the north central United States. *EID* 8:289-297.
- Jackson, L.E. et al. 2006. Towards landscape design guidelines for reducing Lyme disease. *Int. J. Epidemiol.* 35:315-322.
- Maupin, G.O. et al. 1991. Landscape ecology of Lyme disease in a residential area of Westchester County, New York. *Am. J. Epidemiol.* 133:1105-1113.