



Tick behavior and pathogen infection: from individuals to populations

Elise A. Richardson, David J. Buttrick, Samantha A. Shablin, Brittney Jabot, Caitlin E. Taylor, Estelle Martin, Carl N. Keiser



UF UNIVERSITY of FLORIDA

Introduction

- * The lone star tick, *Amblyomma americanum*, is an aggressive, competent vector of many pathogens that pose a known threat to public and wildlife health
- * Pathogen infection is known to induce changes in host-seeking behavior in *Ixodes* ticks¹, but less is known about *A. americanum*
- * *Rickettsia amblyommatis* is a member of the *Rickettsia* spotted fever group and highly prevalent in some lone star tick populations²
- * Here, we aim to test the effect of pathogen infection in tick host-seeking behavior at the individual level and population level, as well as the repeatability of these host seeking behaviors

Methods

- * Adult and nymphal *A. americanum* were collected in 4 different public parks in Gainesville, FL using a tick drag.
- * 10min questing assays
 - * Outdoors in a controlled environment
 - * A subset were tested for three consecutive days

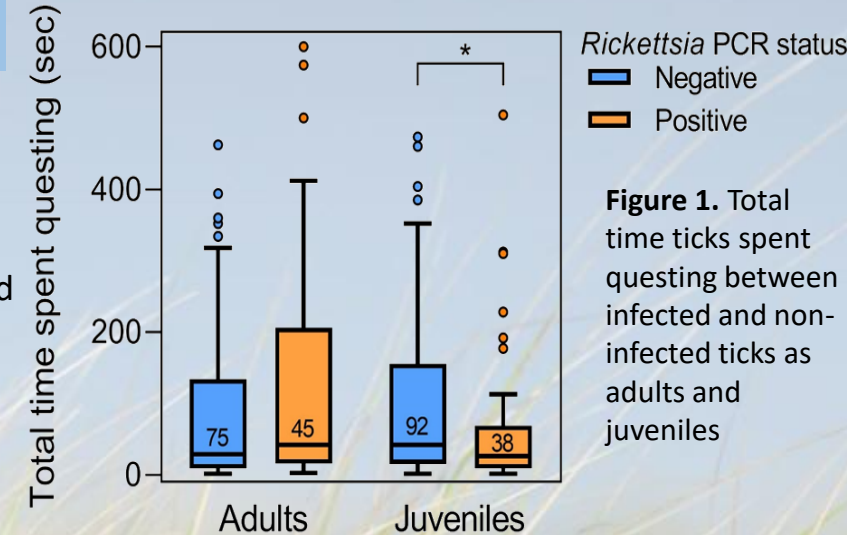
Methods Continued

- * DNA extraction and PCR
 - * Tested all ticks (n=612) for *Rickettsia* and *Ehrlichia* pathogens using pan-family primer pair
 - * Geneious was used to analyze sequences and then blasted against Genbank database



Results

- * **Individual level:** Questing height average ($R=0.238$) and the propensity to quest ($R=0.172$) was found to be significantly repeatable
- * **Population level:** Adult ticks (0.39) had a greater infection prevalence than nymphs (0.28).
- * Juvenile ticks were more likely to engage in questing behaviors
- * Uninfected juveniles spent on average twice as long questing as infected juveniles



Conclusions

- * Presence of a *R. amblyommatis* infection has an effect on a ticks' questing behavior which can influence transmission dynamics
- * Ticks display repeatable, individual differences in questing behaviors

References

1. Belova, O. A., Burenkova, L. A., & Karganova, G. G. (2012). Different tick-borne encephalitis virus (TBEV) prevalences in unfed versus partially engorged ixodid ticks--evidence of virus replication and changes in tick behavior. *Ticks and tick-borne diseases*, 3(4), 240–246.
2. Mixson, T. R., Campbell, S. R., Gill, J. S., Ginsberg, H. S., Reichard, M. V., Schulze, T. L., & Dasch, G. A. (2006). Prevalence of Ehrlichia, Borrelia, and Rickettsial agents in Amblyomma americanum (Acari: Ixodidae) collected from nine states. *Journal of medical entomology*, 43(6), 1261–1268.