Significance

Ticks are tiny arthropods that feed by sucking blood from animals, including mammals, birds, reptiles, and amphibians. In Alabama, lone star, blacklegged, American dog, and Gulf Coast ticks may carry pathogens associated with Lyme disease, spotted fever rickettsiosis, ehrlichiosis, and many others. Ticks opportunistically attach to wildlife, pets, and humans, and, if infected, can transfer pathogens to the host during feeding. An infected host can act as a reservoir for pathogens (e.g., white-tailed deer and ehrlichiosis) and transport ticks to new areas, facilitating tick dispersal and disease transmission.

In Alabama, the number of tick-borne illness (TBI)-related cases continues to increase every year. As climate changes and habitats are altered by human activities (i.e., urbanization, agriculture, etc.), tick and host distributions and disease transmission rates are expected to shift and grow. Additionally, the high occurrence of ticks throughout Alabama, little is known about their current distribution, relationship to wildlife and climatic variables, or degree of TBI transmission.

Objectives

- Use Alabama DCNR’s Wildlife Management Areas (WMAs), AU-owned properties, other state/public areas, and private land to collect ticks and monitor wildlife
- Analyze tick, TBI, wildlife, vegetation, and climate data using a negative binomial regression with zero-inflated model
- Use field collected data to validate model(s)
- Run regression analysis and predictive modeling under various future climate, land use, and demographic scenarios

Approach

- Samples from white-tailed deer harvested during summer reproductive studies and winter hunting seasons
- Monthly sampling of 105 plots using dry ice, a CO2 attractant, in residential, agricultural, and forested sites
- Opportunistic collections from raccoons and feral hogs
- Ticks collected in ETOH, identified, and screened for Ehrlichia, Rickettsia, and Borrelia TBI species using PCR
- Ticks stored in ETOH, identified, and screened for Ehrlichia, Rickettsia, and Borrelia TBI species using PCR

Discussion Points

- Illness transmitting ticks are active year-round in Alabama and can be found in areas where people recreate, work, and relax, such as backyards, parks, and hunting areas
- Dragging, a traditional tick sampling method used throughout the US, is inefficient for southeastern ticks. Future sampling efforts should consider using dry ice or collections from wildlife, depending on ticks desired
- Wildlife play a critical role in tick survival and movement, especially in regard to deer and blacklegged ticks in the cooler months, and feral hogs and American dog ticks in warmer months
- Preliminary analyses suggest that adequate temperature, moisture availability, and substrate structure at the forest floor level greatly affect tick abundance, agreeing with past research from other parts of the US

Acknowledgements

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References


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