



Where Ticks Hang Out

The Question: Which habitats in the park have the highest numbers of Rocky Mountain wood ticks (*Dermacentor andersoni*)?

The adult stage of the Rocky Mountain wood tick can cause tick paralysis in humans and domestic animals. It also is the primary tick vector of the pathogens causing Colorado tick fever, Rocky Mountain spotted fever, and tularemia in the intermountain west. This project was designed to provide information on where ticks might be commonly encountered. It analyzed microhabitat preference of the Rocky Mountain wood tick, including factors such as hill slope aspect, vegetation, and microclimate.

The Project: Collect ticks in various habitats and associate their relative abundance with site environmental factors.

Dr. Lars Eisen and his associates from Colorado State University collected ticks by “drag sampling” (dragging a piece of white flannel cloth over the vegetation that the host-seeking ticks attach to) in a variety of habitats at different elevations. These sites included the Poudre River Canyon, just north of the park; Eagle Cliff Mountain, Windy Gulch, Hollowell Park, Fall River, Deer Mountain. Analysis of the data provided information on microhabitat use patterns by adult ticks and the environmental factors indicating increased risk of tick exposure. Specific aims of the study were to:

(1) test the hypothesis that big sagebrush (*Artemisia tridentata*) can serve as an indicator of areas of higher risk of tick exposure, (2) determine which microhabitats represent the highest risk exposure to ticks in their preferred south-facing grass-brush-conifer habitat, and (3) explore associations between deer/elk abundance, vegetation cover, microclimate, and tick abundance. A second study in Poudre Canyon examined the relationship between tick abundance and microhabitat climate variables (based on climatic data from 1961-1990).



A female Rocky Mountain wood tick.

The Results: In general, south-facing grassy areas with rocks and brush, especially sagebrush, is the preferred habitat for the Rocky Mountain wood tick in this area.

Big sagebrush, especially on south or west facing slopes, can serve as an indicator of higher risk of tick exposure. Relationships between microclimatic variables and tick abundance were complex. Ticks preferred humid microclimates and temperatures were important in predicting tick abundance. Tick abundance peaked at a mean annual maximum temperature of ~10°C (50°F) and a mean annual growing degree day value of ~650. A degree-day is a measurement used by plant physiologists to describe how much warming a plant has been exposed to during the growing season. These climate conditions and the highest tick abundances occur at mid-range elevations along the Big Thompson River and Poudre River and are found at the lower elevations of the park.

With regards to microhabitats, open grass and grass bordering rock on south-facing slopes produced the greatest abundance of ticks in the park. Surprisingly, despite the higher abundance of elk in the park, tick abundance in southwest-facing, grass-brush-conifer habitats were two- to four-fold higher in similar sites found in Poudre Canyon. Dr. Eisen speculates that this is related to elk browsing being so intense in the park that it changes the microhabitat on south-facing slopes (for example resulting in smaller and more sparse brush) and makes it less favorable for the tick to survive and find small mammal hosts to feed on in its immature life stages.

This summary is based on published, peer-reviewed and/or unpublished reports available at the time of writing. It is not intended as a statement of park policy or as a definitive account of research results.

For more information on the park's research program, see www.nps.gov/romo

Written by: Bert Cushing Date: 09/20/2010 Photo credit: James Gathany accessed through Center for Disease Control's Public Health Image Library (<http://phil.cdc.gov/phil/home.asp>)