

Diel and seasonal activity and trapping of ticks (Acari: Ixodidae) in Northern Virginia, U.S.A.

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Abstract

The effectiveness of various trap intervals (two, four, six, eight, sixteen and twenty-four hours) for collecting ticks was compared for different times of the day throughout a one-year period. A total of 9,508 ticks [*Amblyomma americanum* (L.), *Amblyomma maculatum* Koch, *Dermacentor variabilis* (Say), *Ixodes scapularis* Say; (Acari: Ixodidae)] were collected on carbon dioxide baited traps. The eight-hour (8:00–16:00 h) trapping interval caught the most ticks. *Amblyomma americanum* nymphs and adults as well as *I. scapularis* nymphs were most common in May, while *I. scapularis* adults were collected most often during the winter months. Peak *A. americanum* activity shifted from midday to morning during the warmest months of the year.

Key words: *Amblyomma americanum*, *Dermacentor variabilis*, *Ixodes scapularis*, ticks, activity, trapping

Introduction

Ticks of the family Ixodidae are the main public health disease vectors in the United States. They are responsible for the transmission of pathogens causing Lyme disease, tularemia, anaplasmosis, babesiosis, ehrlichiosis, Rocky Mountain spotted fever and other illnesses. Ticks that are important public health vectors often feed on a wide array of hosts, some of which are the natural reservoirs of these pathogens. Ticks generally have two host-seeking strategies: ambushing and hunting. Host-seeking behaviors are responses to environmental and biochemical cues such as carbon dioxide. Ambushing or “questing” ticks wait on vegetation for a host to walk by, whereas hunting ticks actively seek out hosts. Tick sampling techniques, such as using cloth to “drag” or “flag” vegetation, exploit questing behavior, while traps baited with dry ice take advantage of hunting behavior. Dry ice traps have been found to be more effective than cloth drags and ambulatory human host collections for sampling *Ixodes scapularis* and *Amblyomma americanum* (Kinzer *et al.*, 1990; Solberg *et al.*, 1992). Trapping minimizes individual biases that may occur with flagging or dragging and also allows the collector to sample multiple sites at the same time. Though the daily activity patterns of some ticks have been described (Semtner & Hair, 1973a; Punyua *et al.*, 1985) information is still lacking on which times of day and trapping intervals are most effective for collecting ticks. The purpose of this study is to address these needs.

Materials and methods

Field sites

Two sites in Fairfax County, Virginia, were used. Fairfax, a 1,023 km² county with more than a million residents, is located in northern Virginia among the suburbs of Washington, DC. The