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## Understanding the Natural History of Juvenile *Amblyomma maculatum* in Southeastern Virginia

Christina Espada  
*Old Dominion University*

Holly Gaff  
*Old Dominion University*

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**ABSTRACT** *Amblyomma maculatum* is a species of increasing public health concern. Adult *A. maculatum* is a known vector of several pathogens including *Rickettsia parkeri*, the causative agent of *Rickettsia parkeri* rickettsiosis. *Amblyomma maculatum* has expanded northward from its historic range along the Gulf Coast, with populations reportedly establishing in southeastern Virginia in 2010. Recently established populations of *A. maculatum* tend to have higher *R. parkeri* infection prevalence compared to longer established populations. This pattern holds for all populations found so far in southeastern Virginia, with a prevalence of *R. parkeri* in about 60% of *A. maculatum* compared to a prevalence of around 10-40% in these ticks in most regions of the United States. While the predominant hosts of all life stages of *A. maculatum* in Virginia are unknown, preliminary work has found native rodent species acting as hosts to immature *A. maculatum*, with three species likely playing a role in the enzootic cycle of *R. parkeri*.

## Introduction

- Hosts for the juvenile life stages of the Gulf Coast tick (*A. maculatum*) unknown in Virginia
- Unique assemblage of small mammals in VA may contribute to high *R. parkeri* prevalence in these ticks
- Unlike adults, juvenile Gulf Coast ticks are not readily collected from the vegetation. They must be collected from hosts.
- Small mammal sampling from 2011-2019 at sites with known populations of adult *A. maculatum* to:
  1. Determine hosts of juvenile ticks
  2. Identify potential reservoir or amplifying hosts of *R. parkeri*



*Amblyomma maculatum* ticks (Graham Snodgrass)

## Small Mammal Species



(A) Hispid cotton rat (B) Marsh rice rat (C) Meadow vole

## Results

Species	Number of mammals captured	Total ticks	Total infected ticks	Number with infected tissues
Hispid cotton rat	466	193	96	20
Marsh rice rat	186	82	23	18
Short-tailed shrew	332	2	2	0
Meadow vole	186	4	3	2
Eastern harvest mouse	99	3	0	0
House mouse	92	6	0	0
Golden mouse	16	1	0	0

Juvenile Gulf Coast ticks, those infected with *R. parkeri*, and infected tissues from small mammals 2011-2019

## Methods

### Field Collection

- Live trap small mammals
- Ticks and ear biopsy collected

### Tick Identification

- Identification by morphological and molecular techniques

### *Rickettsia parkeri* Detection

- Both ticks and tissues tested



Field Collection of Small Mammal Hosts

## Discussion

- Juvenile ticks found on 7 small mammals
- Cotton and rice rats had largest tick numbers, and are likely predominant hosts in southeastern Virginia
- Cotton rat, rice rat, short-tailed shrew, and meadow vole were parasitized by ticks infected with *R. parkeri*
- Cotton rat, rice rat, and meadow vole were only species with *R. parkeri* -infected ticks and tissues
- These 3 species may play a role in the enzootic cycle of *R. parkeri*

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