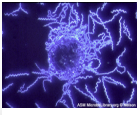






**SPECIES COMPOSITION AND PREVALENCE
OF *BORRELIA* INFECTIONS IN *IXODES* TICKS**
FROM THE SOUTHEASTERN COASTAL UNITED STATES




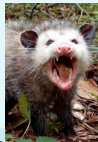
Lauren Maestas
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Photo Credits:
Robert Auldridge, Charissa Wright,
Marina Rivera, Daniel Sauerwald, Holly Galt,
M.D. Dominick, University Dept. of Biology



Outline

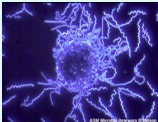
- ▶ Introduction and Justification
- ▶ Objectives
- ▶ Methods
- ▶ Anticipated Results
- ▶ Future Directions



Introduction & Justification

M.S. research project on *Ixodes* ticks in the southeastern coastal United States:

- tick species composition
- prevalence of the Lyme bacteria



Why study Lyme disease in the Southeastern United States?

Bridging Vector

Lyme Disease Human Risk Map

• Ticks can and trans...
 • greater vector of path...
 • domestic animals...
 • sympatric
 • rise second...
 • worldwide...
 • mission.

I. scapularis

I. affinis

Photo Credits:
 Robert Neudorfer
 Robert P. Taylor, Daniel Sorenson, John C. O'Connell
 Old Dominion University Dept. of Biology
 Maria Paula Wozniak

Biology of Vectors & Pathogen: Lyme disease cycle

Ixodes affinis
Ixodes scapularis

- Both have a 1-2 year life cycle
- Both feed on multiple wildlife hosts

<http://www.humanpress.com/Infectious-Diseases-10-Min-Lyme-Disease.html>

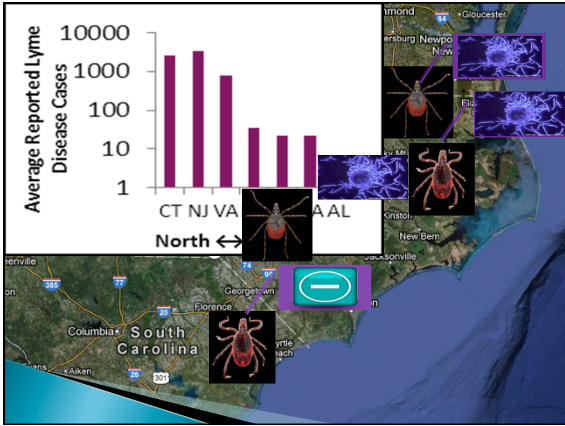
Lyme disease in the Southeast?

0% *Bbs!*

40% *Bbs!*

Maggi 2009

A. Causey personal communication







3. Laboratory Methods

Sample from Field

- Morphological ID [Kierans and Litwak 1989, Cooley 1944]
- DNA Extraction (Qiagen) [Beati 2001]
- Minimum of 50 samples from each region (of both spp) [Beebe 2008]

Ticks: Molecular ID

- 16s Primers published by Norris (1996)
- Sequenced by UTK Molecular Biology Resource Facility
- 100 randomly selected samples to be molecularly identified

Bbsl - Real Time PCR

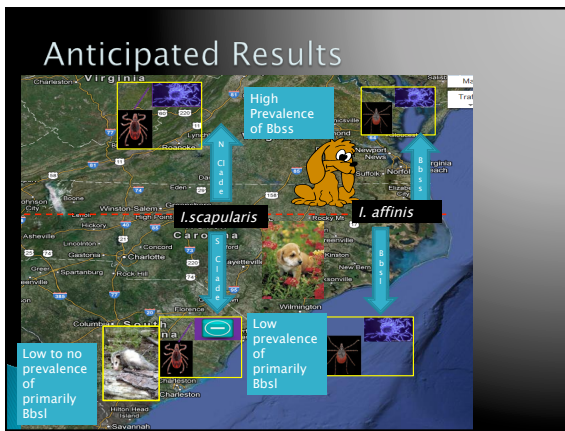
- Screening for *Bbsl*
- 23 S rRNA

Bbsl - Nested IGS PCR

- Outer & Inner IGS Primers published by Courtney (2004)
- Sequencing

Tick & Bbsl - Genetics

- 16s Mitochondrial DNA
- Haplotype variation by region [Norris 1996]



Statistics

- Test genetic differences in ticks and *Borrelia* between states using AMOVA (Norris et al. 1996)
- Test for an association between *Borrelia* prevalence and latitude using Correlation Analysis
- Test for differences in *Ixodes* species composition among states using Chi-Square Tests of Association

Questions?