

## A Project Report on the NSF Funded Lyme Gradient Project – Graham Hickling

- a) Latitudinal gradient seen in Lyme Disease cases
  - 1) 40 per 100,000 in North
  - 2) 0.4 per 100,000 in South
- b) Why?
  - 1) Genetic differences in ticks?
  - 2) Ecological differences?
  - 3) Host differences?
- c) Project
  - 1) Standardized sampling methods
  - 2) Multiple sites
    - (i) 8 sites in different states
    - (ii) 3 arrays per site
    - (iii) collections
      - (a) Ticks off vegetation
      - (b) Ticks off hosts
      - (c) Host information
      - (d) Abiotic factors
    - (iv) Sampling
      - (a) Timing
        - (i) 2-3 week intervals
        - (ii) May-Oct
      - (b) Climate station at each site
      - (c) Host collection
        - (i) Live traps for small & medium mammals
        - (ii) Pitfall traps
        - (iii) Burlap sacks on tree trunks
        - (iv) Coverboards
        - (v) Trail cams to determine host diversity
      - (d) Dragged and flagged (paper)
    - (v) Results
      - (a) Does *I. scapularis* abundance vary by region (adults collected in winter)?
        - (i) Tick was found everywhere
        - (ii) More adults found up north
        - (iii) Inland sites have lower abundance
      - (b) Why?
        - (i) Fewer hosts?
        - (ii) Poor adult survival?
          - 1. Clay soils?
          - 2. Freeze/thaw cycles?
      - (c) Does *Borrelia burgdorferi* infection vary regionally (% in questing ticks)?
        - (i) North is much higher than south
        - (ii) Why?
          - 1. Low tick numbers?

2. Reservoir incompetence (lizard vs mouse?)
  - a. Most infected ticks lose infection when feeding on a lizard
  - b. Larvae feeding on lizards do not get infected
- (d) Does questing behavior of nymphs vary regionally?
  - (i) Rarely find *I scapularis* on people in the south
  - (ii) Almost never a nymph
  - (iii) Why?
    1. Low number of nymphs found when dragging
    2. Behavioral thing
      - a. Need to climb up to get attached to larger animals
      - b. Southern nymphs don't climb very high
      - c. If they stay in the leaf litter, they don't attach
- d) What is the underlying cause for this?
- e) Info
  - 1) Lyme Gradient Website (<http://lyme-gradient.tennessee.edu>)
  - 2) Blog (<http://lymegradient.blogspot.com>)