Prevalence of Bacterial Pathogens in Ixodid Ticks in Chatham County, NC – Charlie Apperson

1) Tick bites occasionally result in the transmission of pathogens
   a) 60% are zoonoses
   b) Just and FYI - 80% of pathogens with a high potential for bioterrorism are zoonotic
2) Ticks require a bloodmeal to complete their life cycle
3) Common ticks of NC
   a) American dog tick – *Dermacentor variabilis*
   b) Brown dog tick – *Rhipicephalus sanguineus*
   c) Dark-legged (deer) tick – *Ixodes scapularis*
   d) Lone star tick – *Amblyomma americanum*
4) Tick-borne diseases
   a) Lyme Disease
   b) Spotted fever rickettsioses, including RMSF
   c) *Ehrlichia chaffeensis* infection, formerly HME
   d) *Anaplasmosis phagocytophilum* infection, formerly HGA
5) Deer are important in the tick life cycle
6) Some specifics
   a) Lyme disease
      i) Distribution does not match up with the distribution of the vector
      ii) Disease associated with feeding of nymphal stage
      iii) *Peromyscus* mice, as well as some other small rodents, important reservoirs
      iv) Black-legged ticks
         (1) 2-year cycle
         (2) Nymphs feed prior to larvae and infect rodents
      v) Case rates lower as you go south
         (1) Ticks feed on lizards
         (2) Dead end host for the spirochete
         (3) Breaks transmission cycle
   b) RMSF (http://www.cdc.gov/mmwr/PDF/rr/rr5504.pdf)
      i) 2 primary vectors – geographic differences, east to west
      ii) Pathogen – *Rickettsia rickettsia*
      iii) Wide variety of *Rickettsia* spp cause similar diseases
      iv) Increasing incidence of cases in NC – 10 fold increase since 2000
      v) >95% of cases are not laboratory confirmed
         (1) Collaborative eco-epidemiological study
         (2) Looking for true disease burden
7) Enhanced surveillance study (RMSF)
   a) Disease data collection
      i) Chatham County NC outpatient clinics
      ii) 4 physician practices from area
   b) Case classification (http://health.state.ga.us/pdfs/epi/gers/Mar08GER.pdf)
      i) Probable
      ii) Confirmed
   c) Tick surveys

i) Primarily collected lone star ticks
ii) Also collected American dog ticks and deer ticks
iii) Found a high number of ticks containing rickettsial species (at 44% of sites)
iv) Some other pathogens reported as well
v) Results
(1) Negative correlation between infection in ticks of *R amblyommii* and other rickettsial species
(2) 6 of 15 *Ixodes scapularis* nymphs were infected with *Borrelia burgdorferi*

d) *R amblyommii* may be the problem pathogen and not *R rickettsia*

8) A lot of questions generated from this study