

Title: Presence of *Borrelia*, *Rickettsia*, and *Ehrlichia* in Field-collected Ticks on Candler Mountain, VA

Program of Study: Biology

Presentation Type: Print Poster

Mentor(s) and Mentor Email: Dr. Davis McGuirt, dmcguirt@liberty.edu

Student name(s) and email(s): Lara Colombo, lecolombo@liberty.edu

Heather Stanley, hestanley@liberty.edu

Category: Experimental (Applied)

Abstract

Tick collection is required for disease surveillance and depends on a comprehensive understanding of ticks' habitats, life cycles, and diseases they may carry. A tick field collection was begun in March of 2015 on Candler Mountain in Lynchburg, Virginia to begin investigation of the tick population at that site and to obtain ticks for testing for three disease-causing agents. CO₂ traps were utilized in the capture of the ticks. To create the most efficient trap, the tapes used on the traps were experimentally tested with a force transducer in the lab. The goal was to use traps that would capture the greatest number of ticks. The results from the experiment identified colored lab tape and duct tape as the most efficient tapes to use for the CO₂ traps. From March 2015 through June 2015, 59 deer ticks (*Ixodes scapularis*) and 3 lone star ticks (*Amblyomma americanum*) were collected. Analysis will be done on the 2015 ticks looking for disease-causing agents. The individual tick DNA will be extracted, purified, isolated, amplified, and run on gel electrophoresis. The agents tested for will include those that cause Lyme Disease,

Rocky Mountain Spotted Fever, and Ehrlichiosis in humans. This is a long-term ecological project. Tick collection will resume in March 2016 to continue analysis of the tick population on Candler's Mountain.

Christian World View integration

Since the fall of Adam and Eve, sin has entered into the world. Perfect creation became flawed and disease points to this issue. Tick-borne disease is found throughout the world and is prevalent in the United States. In Genesis 1:26, God says "Let us make mankind in our image, in our likeness, so that they may rule over the fish in the sea and the birds in the sky, over the livestock and all the wild animals, and over all the creatures that move along the ground." Even though we are no longer in the Garden of Eden, I believe this command is still applicable to us today. As God's people we are to be good stewards of His creation, one way to do so is by disease prevention. To prevent disease in both animals and humans one must be aware of the possible risks in the environments. Ticks are major vectors of disease such as Lyme Disease, Rocky Mountain Spotted Fever, and Ehrlichiosis. This study will benefit the local area of Lynchburg because it will provide an understanding of the tick-borne diseases that are prevalent on Candler's Mountain. Candler's Mountain is popular amongst the locals of Lynchburg as it offers a number of hiking and biking trails. However, there has never been any collection done on the possible presence of tick-borne diseases on this mountain. Therefore, with this study people will be informed of the risks taken in hiking, biking, or dog walking through these trails and thus take precautionary measures in protecting themselves and their pets from being infected.