

Andrew Woolery, History and Biological Sciences

University: University of Missouri

Year in School: Senior

Hometown: Blue Springs, Missouri

Faculty Mentor: Dr. Roger W. Stich, Veterinary Pathobiology

Clearance of endosymbionts in the tick vector *Rhipicephalus sanguineus*

Andrew Woolery, Jennifer McClure, and Roger W. Stich

Vector-borne diseases reduce livestock production in areas whose human populations are starving, such as the Tsetse belt in Africa. In the United States, people are infected every year with Lyme disease, Rocky Mountain Spotted Fever, and Human Monocytic Ehrlichiosis. A method of controlling vectors, such as ticks, would have many uses. Previous studies have indicated that all ticks of the species *Amblyomma americanum* are infected with a *Coxiella* sp. bacterial symbiont. After treatment with the antibiotics rifampin and tetracycline, nymphs and adults were shown to have lower numbers of this symbiont and treatment of engorged adult females was shown to result in decreased fecundity (Zhong et al. 2007). It was speculated that this *Coxiella* symbiont plays a vital role in tick fitness and female fecundity. The goals of the current experiment are to: demonstrate the presence of the same or similar symbiont in *Rhipicephalus sanguineus* adults and larvae, demonstrate clearance of the symbiont in larvae after treatment with antibiotics, observe any negative effects on the fecundity of the treated females, and test the acquisition rate of larvae that feed on a carrier of *Ehrlichia canis*, a pathogen of which ticks are a vector. A *Coxiella* sp. symbiont was shown in adult and larvae *R. sanguineus* using PCR. Adult females were then fed with males on dogs to repletion, with several groups receiving different treatments of antibiotics prior to mating. Three of the treatment groups suffered significantly lower fecundity than the control. DNA from the resulting larvae was PCR assayed for symbionts, and the *Coxiella* symbiont has been found in lower numbers in the larvae of these treated groups. The next phase of the experiment is to feed symbiont cleared or reduced larvae on an *E. canis* carrier and compare their rate of acquisition to untreated larvae.