



RESEARCH PROGRESS REPORT SUMMARY

Grant 01780: Defining the Mechanism by Which Ticks Locate Dogs in Order to Better Prevent Disease Transmission

Principal Investigator: Dr. Emma Natalie Ivy Weeks, PhD

Research Institution: University of Florida

Grant Amount: \$104,867.31

Start Date: 3/1/2013 **End Date:** 2/28/2015

Progress Report: Mid-Year 2

Report Due: 8/31/2014 **Report Received:** 10/31/2014

Recommended for Approval: Approved

(Content of this report is not confidential. A grant sponsor's CHF Health Liaison may request the confidential scientific report submitted by the investigator by contacting the CHF office. The below Report to Grant Sponsors from Investigator can be used in communications with your club members.)

Original Project Description:

The brown dog tick (BDT) is common across the U.S. and is the most widely distributed tick in the world. BDT's are capable vectors of pathogens that cause canine ehrlichiosis and babesiosis as well as other disease agents. Prevention of these diseases is accomplished through tick control. BDT's can complete their entire life cycle indoors, making management difficult. Records of infestations are increasing and unpublished data indicates that a high level of pesticide resistance is present in domestic populations. Consequently once introduced, these ticks are particularly hard to eradicate and as one female tick may lay 5,000 eggs, the problem soon gets out-of-hand. Pesticide resistance leads to aggressive treatment regimes, which in turn, lead to increased exposure of humans and pets to acaricide residues. Alternatives to pesticide applications are needed. Studies have shown that BDT's are attracted to dog odor, a blend of volatile chemicals used by ticks to find a blood meal. Identification of the chemicals BDT's use to locate a dog (semiochemicals) would enable manipulation of tick behavior thereby facilitating management and reducing the need for extensive use of pesticides. Improved tick control without the need for increased pesticide applications will improve the quality of life for dogs and their owners or handlers. Work will be accomplished through four successive objectives to 1) collect dog odor, 2) identify chemicals that ticks can detect, 3) test chemicals for tick attraction and ultimately 4) evaluate efficacy of an attractant-based tick trap.



Grant Objectives:

The goal of this study is to identify chemicals from within dog odor that are tick attractants and that could be used as part of a surveillance trap in kennels or homes, or in attract-and-kill devices.

Publications:

None at this time.

Report to Grant Sponsor from Investigator:

The brown dog tick (BDT) is common across the US and the most widely distributed tick in the world. BDT's are capable vectors of pathogens that cause canine ehrlichiosis and babesiosis as well as other disease agents. Prevention of these diseases is accomplished through tick control. BDT's can complete their entire life cycle indoors, making management difficult. Records of infestations are increasing and unpublished data indicates that a high level of acaricide resistance is present in domestic populations. Consequently once introduced, these ticks are particularly hard to eradicate and as one female tick may lay 5,000 eggs, the problem soon gets out-of-hand. Acaricide resistance leads to aggressive treatment regimes, which in turn, leads to increased exposure of humans and pets to acaricide residues. Alternatives to pesticide applications are needed. Studies have shown that BDT's are attracted to dog odor, a blend of volatile chemicals used by ticks to find a bloodmeal. Identification of the chemicals BDT's use to locate a dog (semiochemicals) would enable manipulation of tick behavior thereby facilitating management and reducing the need for extensive use of acaricides. Improved tick control without the need for increased acaricide applications will improve the quality of life for dogs and their owners or handlers. Work will be accomplished through four successive objectives to 1) collect dog odor, 2) identify chemicals that ticks can detect, 3) test chemicals for tick attraction and ultimately 4) evaluate efficacy of an attractant-based tick trap.

To date we have been working towards the completion of our first and second objectives as well as establishing the techniques for the third and fourth objectives. For the first objective, the collection of dog odor, sample animals of the required quantity and breed have been identified and verbal consent obtained for the procedures to be completed. 60% of the samples have been collected and the samples have been analyzed by chromatographic techniques. For the second objectives the techniques necessary have been established including behavioral bioassays and electrophysiological procedures. Attraction has been demonstrated to positive controls and electrophysiological responses to known tick attractants have been shown. Further studies will test the response of ticks using behavioral and electrophysiological means to determine the biologically-active chemicals in dog odor. These chemicals will then be tested in the behavioral bioassay and in traps.