

TO: Dr. Jack Hamm, Vice President for Academic Affairs

FROM: Dr. Tsunemi Yamashita, Associate Professor of Biological Sciences

DATE: March 8, 2007

SUBJECT: Spring 2004 Faculty Research Grant report

Project Title: Molecular biology of the striped scorpion (*Centruroides vittatus*): population genetic structure and toxin gene analysis.

B. Abstract:

Population genetics is a subdiscipline of genetics that examines genetic variability within populations and genetic differentiation among them. This project investigates the genetic structure of a widespread scorpion species, *Centruroides vittatus*. Employing molecular DNA techniques, we plan to create a robust evolutionary tree that shows the genetic separation among scorpion populations. In addition, we plan to investigate the differentiation within toxin genes among scorpion populations. The impetus for the genetic analysis of population structure stems from preliminary data that suggests this scorpion species expanded from a glacial refuge in the south. The toxin gene analysis breaks new ground as no systematic investigation of toxin gene variability among populations within a species has been completed. In addition to the research aspects, this project will also improve the preliminary data needed to attract larger grant awards from outside sources. Lastly, this project will support the implementation of new equipment provided through a UAMS BRIN equipment award into the biology curriculum.

C. Results and outcomes:

The research generated from the Faculty research award allowed the creation of a phylogenetic tree from approximately 30 scorpion populations. The results from this endeavor was presented at several meetings (Arkansas Academy of Sciences and the American Arachnological Society) as well as recently submitted for publication in a evolutionary journal. The information provided from these studies was also used as preliminary evidence for a recent research proposal submitted to NIH. These results are also important in providing information for ongoing studies with the population genetics, evolutionary history, and toxin gene analysis in this scorpion.