



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Tyler G. Urban	Project Number S2212
Project Title Fringed Families: A Study of the Phylogeny of the Mojave Fringe-Toed Lizard through Morphology, Geology, and Genetics	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Because of the Mojave fringe-toed lizard's strict habitat requirements (sand with scrub hummocks [Aeolian specialists]), many separated populations are in threat from human activities. Therefore, the objective was to investigate the phylogeny of four separate populations of <i>Uma scoparia</i> in the Mojave Desert and to suggest conservation action if necessary.</p> <p>Methods/Materials Lizard nooses, a terrarium, a ruler, satellite maps, prior similar research projects' results, and a gene decoding website were used. Seven lizards were collected from the Mojave Desert at four different locations. Morphology was examined in each specimen using a defined set of reference points. For geology, a geologist was consulted and evaluations of the terrain (barriers/corridors) were drawn from maps as well as geologic history. The genetic information observed in the diagrams from the prior studies and also seen in a re-analysis of the population sets of gene codes submitted to a Genbank.</p> <p>Results Of the 9 points of reference used to compare the specimens' morphology, 3 (#of supralabial scales, the # of ventral tail spots, # of front toes with fringe) exhibited similarity, 2 (inguinal spots, ocelli distinction) exhibited plausible difference, and 4 exhibited direct difference. The confirmed differences in patterning resided in the references of the # of throat crescents, the # of ventral pelvic spots, the presence of tibial banding, and the actual permanent color shade. The geology data supported the population separation hypothesis in showing that 1 of the 4 locales was physically isolated. The DNA comparison of the gene sets in the outside study revealed that three locations on and north of the Mojave River were all close enough in relation to be grouped into one clade of the Mojave River Drainage. The Cadiz location was grouped only with one other place tested in the other study in a distinct clade originating back to the base relation break.</p> <p>Conclusions/Discussion The morphology data and geographical separation show measurable differences in appearance and absence of contact between some populations of the species <i>Uma scoparia</i> in the Mojave Desert. Therefore, it's clear that the population segments are distinct but yet unknown as to what degree of difference there is in phylogeny.</p>	
Summary Statement A study that observed the phylogeny of <i>Uma scoparia</i> through morphology, geology, and genetics.	
Help Received Prior studies were researched for information with relevance to this study.	