



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> Sonia M. Sotelo	<b>Project Number</b> <b>S1910</b>
<b>Project Title</b> <b>The Effects of Water Temperature and Aeration on the Hatching of Branchinecta mackini Cysts</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project was to determine an efficient way to hatch Alkali fairy shrimp (<i>Branchinecta mackini</i>) by observing the effects of water temperature and aeration on hatching rates. There are five species of freshwater shrimp that dwell in the playas of Edwards Air Force Base, located in the Mojave Desert. However, human activity is a threat to these vulnerable creatures. Many of California's fairy shrimp habitats are disappearing rapidly due to urbanization and agriculture. To prevent extinction, additional habitats, including those that are man-made, must be created.</p> <p><b>Methods/Materials</b> The project was begun by actually going out to a flooded playa and examining live fairy shrimp. 13 samples of soil were collected from random locations in claypans and road pools. The control of the experiment was store-bought brine shrimp, and they were hydrated by pouring 1 liter of distilled water into the bottles. The effects temperature had on the hatching rate of cysts placed outside (with temperatures dropping as low as 20°F), inside at 63-68°F, and maintained at 80°F with the aid of a heat lamp were all observed. The same experiments were done for all of the soil samples, and over 50 samples total were observed.</p> <p><b>Results</b> Of the 13 different samples of soil that had been obtained, only 8 yielded any fairy shrimp hatchlings. The control had shown that in all four experiments, some cysts should be able to hatch once exposed to water. More cysts had hatched once exposed to 80°F than at any other temperature. Those that had been placed outside had produced the second most, while aeration actually produced less. Very few shrimp hatched after two weeks of being exposed to water.</p> <p><b>Conclusions/Discussion</b> The experiment did not support the hypothesis. Aerated water yielded 26% less fairy shrimp than that of the water maintained at 80°F. It can not be automatically assumed, however, that higher temperatures will always yield a higher number of fairy shrimp. More hatchlings were found in the bottles that were left outside than in those that had been placed inside at room temperature. This shows that fairy shrimp found on and around Edwards AFB are hardy creatures that have adapted to their environment. It is necessary for their hatching, growth, and reproduction rates to be high if they are to survive.</p>	
<b>Summary Statement</b> The study of growing <i>Branchinecta mackini</i> by experimenting with temperature and aeration.	
<b>Help Received</b> Allan Bourbina, a wildlife conservationist, accompanied me when I was collecting soil samples on Edwards Air Force Base.	