



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Riley E. Rich	Project Number J1116
Project Title Water Quality Changes in Redtail Fairy Shrimp Environment	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I was drawn to studying fairy shrimp after hearing about how important they are from my neighbor who works for the U.S. Fish and Wildlife Service. He showed me different types of fairy shrimp he had collected and saved when he investigated samples at vernal pools. Of course, I could not have any contact with the highly endangered endemic fairy shrimp species, but I was able to accompany him in the field and observe and learn about the fairy shrimp's habitat. As my project, I grew Redtail fairy shrimp (<i>Streptocephalus</i>) from eggs and tested the water quality. I thought that water quality values would change as shrimp grew. I decided to take initial and final measures of water quality to try to determine how their lifespan might be affected by water quality changes. I expected to see changes in the nitrate, phosphate, ammonia, pH, and total dissolved solids levels, due to the accumulation of waste in the environment.</p> <p>Methods/Materials I split the "simple pack" of 50 Redtail fairy shrimp into 6 jars. Then added water per directions. I tested the water temperature, ammonia, dissolved oxygen, biochemical oxygen demand, available dissolved oxygen, nitrate, nitrite, phosphate, chlorine, hardness, total alkalinity, pH, free chlorine, total hardness, total dissolved solids, and turbidity. I fed the fairy shrimp daily and counted the fairy shrimp in each jar on several different days. When the shrimp died, I performed all of the water tests for a second time.</p> <p>Results After performing more than 100 water quality tests, I discovered that the pH remained the same, at pH 8.0. The phosphate increased from 0 ppm to 5 ppm. The total dissolved solids increased from 0 ppm to 48.0 ppm. The ammonia rose from 0 ppm to 1.0 ppm. The dissolved oxygen dropped to between 1 ppm and 2 ppm in five of the six samples. The nitrate and nitrite were at 0 ppm. My nitrate and nitrite test strips may have had problems even though they were still within the code date. I observed fairy shrimp cysts remaining in the six water samples. I photographed a cyst I viewed using a microscope.</p> <p>Conclusions/Discussion In conclusion, ammonia appeared to be at toxic levels in the final readings and the oxygen levels were too low to support life. It seemed that as some of the shrimp died, this may have promoted a die off in the samples. My findings revealed rising phosphate and ammonia levels and decreasing dissolved oxygen.</p>	
Summary Statement My project monitored the effects of time on water quality changes in Redtail Fairy Shrimp environment.	
Help Received Thanks to Chris Powers for taking the time to teach me about our endemic fairy shrimp and introduce me to the vernal pool habitat. Thanks to my parents for their support. Thanks to my science teacher for her guidance and for lending equipment.	