



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Hunter C. Crawford-Shelmadine	Project Number S2205
Project Title Investigation of the Impact of Common Toxicants on Survival Rates of Daphnia magna after Exposure to LC50 Levels	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The main objective is to determine if Daphnia magna are exposed to LC50 levels of common toxicants found in our waterways, then are removed from those conditions, will they have the same long term survival rate as the Control. The secondary objectives are 1) to determine if there is a correlation that the more harmful the toxicant, the shorter the life span once exposed then removed; 2) if exposure to two toxicants has a statistically significant more lethal impact than exposure to one toxicant.</p> <p>Methods/Materials Phase 1-Scouting - determine concentrations needed for acute reaction. Phase 2-Perform 3 trials of 10 Daphnia magna in 10 toxicant solutions [0%, .2%, .5%, 1%, 1.5%] to determine the LC50 [Lethal Concentration when 50% of population dies]. Solutions: oxybenzone sunscreen, zinc oxide sunscreen, imidacloprid pesticide, nitrogen fertilizer, Oxy & Zinc, Oxy & Pest, Oxy & Fert, Zinc & Pest, Zinc & Fert, Pest & Fert. Phase 3-Use LC50 value from Phase 2. Run 3 trials of ea. solution at 1%. Expose Daphnia to time needed to reach the LC50. Remove survivors & place in spring water. Record death rate.</p> <p>Results 1. In all trials except for one, exposure to 1% solutions prohibited the Daphnia from living out a natural lifespan once placed in spring water. Within 24 hours, 100% of the Daphnia were dead in 7 of the 10 solutions. Only exposure to 1% nitrogen resulted in Daphnia having the same survival rate as the Control. Solutions with nit. & oxy. and nit. & zinc survived 72 hrs & 144 hrs respectively. 2. There is NO consistent correlation between time to reach LC50 and long term survival of Daphnia. 3. If the 2 toxicant solution had either imid. or oxy., the difference in the lethal impact to the Daphnia compared to exposure to the toxicant individually was NOT statistically significant. If the 2 toxicant solution contained zinc. or nit., in all cases except for one, the difference in the lethal impact to the Daphnia compared to exposure to the toxicant individually WAS statistically significant.</p> <p>Conclusions/Discussion My hypothesis is mostly correct. All Daphnia exposed to 1 or 2 toxicants were not able to recover to live out a normal life span compared to the Control, with the exception of nitrogen. This shows that not all toxicants will result in certain death after exposure, once removed from the toxic environment. It also shows the importance of reducing the amount of toxicants that enter our waterways.</p>	
Summary Statement This experiment tests how exposure to LC50 levels of common toxicants in our marine waterways impacts the long term survival of Daphnia magna once they are removed from the toxic environment and placed in a clean environment.	
Help Received I designed and performed the experiment on my own. My mom ordered the materials and provided lab assistance under my direction when needed.	