



CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

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Project Title Lumbriculus variegatus and Man-Made Hazards: What Is the Tipping Point?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment is to test how exposure to pesticide, fertilizer, oxybenzone sunscreen, zinc oxide reef safe sunscreen, or acidity at different concentrations effect the blood flow rate of Lumbriculus variegatus and then to repeat the experiment using different combinations of these man-made stressors to better understand how exposure to multiple stressors changes the results.</p> <p>Methods/Materials Build custom slide to contain worm for viewing. Mix concentrations (control .05 .1 .5 1 2.5 5%) for each stressor (above). Place worm in solution for 15 minutes. Remove worm. Count blood flow contractions (bpm) for 60 sec w/40x microscope. You need an assistant to time. Record data and repeat for each solution. Record qualitative observations.</p> <p>Results # PESTICIDE: The presence of pesticide in any .01% combination was lethal but not individually. In a .05% solution, pesticide & oxybenzone sunscreen was lethal, pesticide & fertilizer had a statistically significant reduction in bpm. # FERTILIZER: The addition of fertilizer when mixed with pesticides resulted in a lethal combination, but when mixed with oxybenzone sunscreen did not have a consistent impact to the bpm. # ACIDITY: Lowering to pH6 only had a minor measurable impact when added to the pesticide and fertilizer mixture. There was a statistically significant drop in bpm in the 0.05% concentration. # ZINC OXIDE REEF SAFE SUNSCREEN: The addition of this sunscreen did not have a positive or negative impact on the Lumbriculus variegatus in any combination. # OXYBENZONE SUNSCREEN: The presence of oxybenzone in the water trapped the worms in a thick film which increased BPM whereas virtually all other stressors decreased BPM. # OTHER RESULTS: exposure to fertilizer & pesticide (ind) turned their red colorful insides to gray. After 15 hours of exposure to each stressor, all were alive in .05% & .1% zinc and fertilizer but 100% dead in other solutions.</p> <p>Conclusions/Discussion My hypothesis states that when I measure the effect of a single man-made stressor on Lumbriculus variegatus and compare those results to when they are exposed to multiple man-made stressors, the multiple man-made stressors will have a greater impact on the Lumbriculus variegatus. My hypothesis is partially correct. Only certain combinations of man-made stressors had a statistically significant greater impact on the Lumbriculus variegatus than did the stressor(s) have by itself.</p>	
Summary Statement My experiment shows that certain man-made stressors (toxins/chemicals) in combination do have a greater impact (often lethal) on aquatic life than when exposed to the man-made stressor by itself.	
Help Received My science teacher, Mr. Raffa, provide input & feedback on experimental design and was a great support throughout the project.	