



CALIFORNIA STATE SCIENCE FAIR 2017 PROJECT SUMMARY

Name(s) Emma W. Chusid	Project Number S1203
Project Title Environmental Effects on Health and Behavior of Nematodes	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my research project is to isolate nematodes from collected soil samples, track their behavior and use this information and information about the soil they are isolated from, to observe and measure the relationship between the health of the nematodes and the health of their environment.</p> <p>Methods/Materials Isolation of nematodes: using a test tube, funnel, filter paper, distilled water, microscope, and spit tube. Mix soil with water and filter overnight into the test tube. Locate nematodes in the liquid and move them onto a separate plate using a spit tube. Touch assay: Move one nematode onto a petri dish. Lightly touch with a sterile eyelash on the head, tail and middle of nematode, waiting thirty seconds between each touch. Soil depth analysis: collect soil with soil sampler measuring the depth of each sample. Complete each isolation using a fifteen gram sample, count the number of nematodes found at each depth and compare. Defecation study: place a nematode on a petri dish, use a microscope to watch it and track time between defecations using a stopwatch. Thrashing assay: place one nematode onto a petri dish filled with M9 solution. Record the nematode in thirty second increments, counting the number of thrashes.</p> <p>Results I have been able to see some distinct differences between EC nematodes and <i>C. elegans</i>. Most notably they are visually different, <i>C. elegans</i> are thinner and more elongated while EC nematodes are curved (displaying unc phenotype). <i>C. elegans</i> have an unc phenotype mutation, but curve from the tail and unc EC nematodes curve from the middle. ECs return to the coiled (unc) shape when stressed. Based on defecation assays I have been able to determine that EC nematodes have much slower metabolic rates than <i>C. elegans</i>, whose rate of defecation is generally more than twice as frequent as EC nematodes. I have observed ECs are very tactile, they clump together in groups and move over each other, comparatively <i>C. elegans</i> distribute themselves more evenly across a plate and avoid being on top of one another. ECs are most prevalent when the soil is moist and healthy and prefer to live in the top level of the soil.</p> <p>Conclusions/Discussion EC nematodes seem to be most present when the soil is healthy and I plan to use the health of the nematodes as an indicator for the health of the soil by comparing plant growth, moisture and nutrient content to the number and behavior of the nematodes.</p>	
Summary Statement I found a strong correlation between the health of the soil and the health of the isolated nematodes and categorized wild type behaviors of these nematodes.	
Help Received I completed all of the assays myself but got instruction on basic techniques for manipulation and study of nematodes from my advisor, Dr. Aidyl Gonzalez and found the basic structure for the isolation assay from an online resource. I was also given access to lab facilities by my school, The Buckley School.	