CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)
Shreya A. Rajappa

Project Number
38003

Project Title
Going Up in Flames: Soil Bacteria

Abstract

Objectives/Goals
I wanted to identify the soil type with the highest bacterial biodiversity (number of different bacterial colonies) and to see how fires affect bacterial biodiversity. My project could change how people think about wildfires and the soil type they use in agriculture. The question was: How do different soil types from burned areas affect soil bacterial biodiversity? The hypothesis was: If the soil is unburned clay, then it will have a higher bacterial biodiversity than unburned silt or sand. If the soil is burned, then it will have a lower bacterial biodiversity than unburned soil.

Methods/Materials
I identified the soil type through field observation tests and through an online Soil Web Browser that has mapped out the soil types across California. I measured the dependent variable (bacterial biodiversity) through diluting the soil with distilled water, spreading it on agar petri dishes, incubating the plates in a reptile terrarium, and counting the different colonies.

Results
The results were that unburned clay's average was 6.8 different colonies, compared to the average bacterial biodiversity of unburned silt (4.6 colonies) and of unburned sand (4.4 colonies). Burned clay's average was 4.2 colonies and the averages for burned silt and for burned sand were 4 colonies. Going back to the objective, clay was the soil type with the highest bacterial biodiversity, and fires decrease bacterial biodiversity.

Conclusions/Discussion
The hypothesis should be accepted because unburned clay with 6.8 different colonies had a higher bacterial biodiversity than unburned silt and sand and because the burned soils had a lower bacterial biodiversity than the unburned soils for each type. My project expands our knowledge by showing that fires seem to make all soils have the same qualities since they all had a similar bacterial biodiversity after being burned and bacterial biodiversity depends on the qualities of the soil. My project is important because intense fires occur often in California, and we need to see how these fires affect the foundation for life.

Summary Statement
I wanted to identify the type of soil with the greatest number of different bacterial colonies and to see how wildfires affect soil bacterial biodiversity.

Help Received
I interviewed Dr. Joshua Schimel from UCSB and Mr. Bill Palmisano, who wrote an article about soil and its bacteria. Both interviewees provided background information on soil bacteria and fires and described their own findings from experiments. However, I designed, built, and performed the experiments myself.