CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

33814

Project Title

Determining the Microbial Diversity in Chaparral Soils Before and After Wildfires through DNA Barcoding

Abstract

Objectives/Goals

In this study I tested the effects of fire on microbial communities in chaparral soils through DNA barcoding and the comparison of microbes found in burnt and unburned soil samples.

Methods/Materials

The Soil Sample was collected in the chaparral area, a location was found in December of 2012 where there had been a wildfire in May of 2012. Two areas of collection were found nearby one another around the same elevation where one area was exposed to the fire while the other was not. The gene used for DNA barcoding was the 16S rRNA gene. For PCR two sets of primers were used, one for bacteria and another for archaea. After PCR amplification gel electrophoresis was performed to visualize the DNA. The DNA was then purified and subcloned into the TA plasmid. Sixty-two plasmids were sent to Genwiz for sequencing. The resulting DNA data was used to search the National DNA database (NCBI) using the blastn program.

Results

After receiving nucleotide sequences from the GeneWiz, I ran them through the NCBI online database using the blastn program in order to identify each 16S ribosomal DNA barcode sequence. From the sequences sent in from unburned soil using Bacteria primers, a huge diversity was found. None of the microbes from either burned or unburned soil samples yielded any similarities with each other and other samples. Similar to the unburned soil samples from the Ar primers, many of the samples contained similar microbes, however there were more similarities present in the unburned soil samples.

Conclusions/Discussion

The purpose of this experiment was to determine the long-term affect wildfires have on the microbial community found in chaparral soil. I have found that the arachaea microbes found in both the burned and unburned soil samples have similarities. The data shows that the most abundant microbe found in the unburned samples are much less prominent in the burned samples. I was also able to see a much larger variety in the burned samples meaning that many of these soil arachaea microbes might have quickly moved in after the fire, after the community begins to stabilize, these microbes might displaced.

Summary Statement

Testing if wildfires change the microbial community in the soil and can this information be used to measure recovery after a fire.

Help Received

My mother suggested the project and my father provided guidance in the experimental design.