



Impact of Pollution on Lichen Species Diversity

Question: Does pollution have an effect on lichen biodiversity?

Angelina Shih, Darwin Yang, & Kaitlyn Abraham - Roslyn High School

Mentor: Ms. Lisa Daniels



Abstract

DNA barcoding is a method of species identification. It works by analyzing a specific region of DNA. The sequence of DNA sections is then compared to a reference library to identify the species. Lichens are symbiotic organisms and sensitive to changes in the environment. Our hypothesis was that if a location is more polluted, there will be less diversity of lichen species. For this experiment we chose two locations with different amounts of pollution to collect lichen samples in order to find the impact of pollution on the diversity of lichens. The results after identifying the lichens showed that lichens from the polluted location are different than the lichens found in less polluted areas. Overall, our results show that areas that are polluted contain different types of lichens compared to less polluted areas.

Introduction

Lichens are symbiotic organisms made up of a fungus and an algae. Lichens can be impacted by nitrogen in air pollution or nitric acid in acid rain. Lichens are known environmental indicators especially sensitive to nitrogen compounds. Our group will focus on the impact of nitrogen pollution in the form of nitric acid in acid rain and nitrogen emissions from cars on the biodiversity lichens. We will look at the different species of lichens found in an area that is more likely to have nitrogen pollution compared to an area less polluted.

Materials & Methods

1. Collected, labeled, and photographed lichen samples from Stony Brook University Nature Preserve and Thomas Muratore Park
2. Extracted DNA following protocol from DNALC
3. Amplified DNA with PCR
4. Gel electrophoresis to check for amplification
5. DNA Subway was used to identify samples and phylogenetic relationships

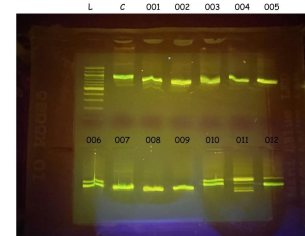
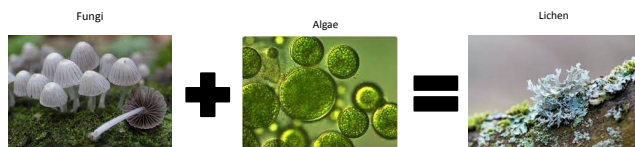
Results

Stony Brook University Preserve: (CHZ-007, similar to *Stereum fasciatum*, similar to CHZ-008)

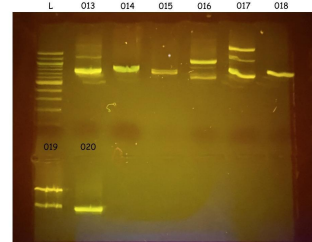
Thomas Muratore Park: (CHZ-011 and CHZ-016 are similar to *Physcia stellaris*, grows on trees in open ranges, in temperature vegetation zones), (CHZ-012, similar to *Caloplaca raesaenen*, found on hard rocks and concrete, able to withstand salt), (CHZ-013, similar to *Xanthomendoza weber*, a sunburst lichen, found in temperate climates in Northern Hemisphere), (CHZ-020, similar to *Stereum fasciatum*, produces cyanide gas, prevents fungus from growing on trees)

Acknowledgements

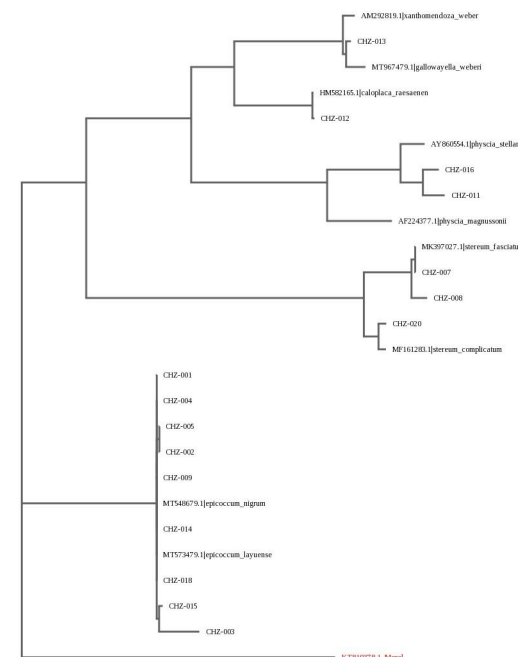
Stony Brook University
Cold Spring Harbor Laboratory
DNALC
Roslyn High School



Sample ID: CHZ Primer: ITS



Sample ID: CHZ Primer: ITS



Discussion

An unpolluted environment such as the Stony Brook University Preserve, generally had species of lichen that live in moist, shaded, or temperate climates. A polluted environment such Thomas Muratore Park, generally had species of lichen that live in open spaces with bright sunlight surrounded by rocks and other hard substances. This year, most of the samples from Stony Brook were lichens that were affected by a fungi. And the samples that were not affected were all fungi and not lichens. As for samples from Thomas Muratore Park, all samples were confirmed to be lichens. There were 7 different species of lichens from Thomas Muratore Park. 5 of the 7 species of lichens are found on hard rocks, concrete, or trees in open fields.

References

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