Airports and Their Effect on the Natural Environment, Utilizing Lichens as a Bioindicator

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Abstract

Lichens are regularly used as air quality bioindicators[1]. The MacArthur Airport's runway is directly in line with the Connetquot State Park, in which lichens can be used to see the airport's effect on the preserve. Using one mile intervals from the airport's runway, lichens were collected and studied from the park. A modified Barcode LI Silica protocol for DNA extraction was used, along with PCR, gel electrophoresis, and finally sequencing and analysis using DNA Subway's Blue Line. While results were inconclusive due to the limited amount of samples, we were able to successfully barcode one sample, in which it was the actual lichen barcoded and not another form of fungi. In addition, we had a sample where the forward barcode was for one species, and the reverse was another species, likely due to the sexual reproduction of lichen[8].

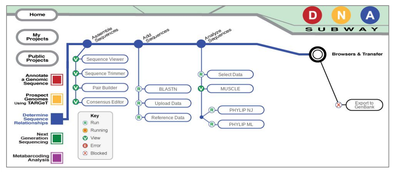
Introduction

How does air pollution from airports affect lichen biodiversity?

Methods & Materials

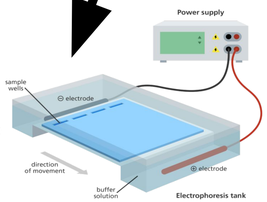
Extraction with modified Barcode LI Silica Protocol

PCR with Fungi (Lichen Specific) ITS primer



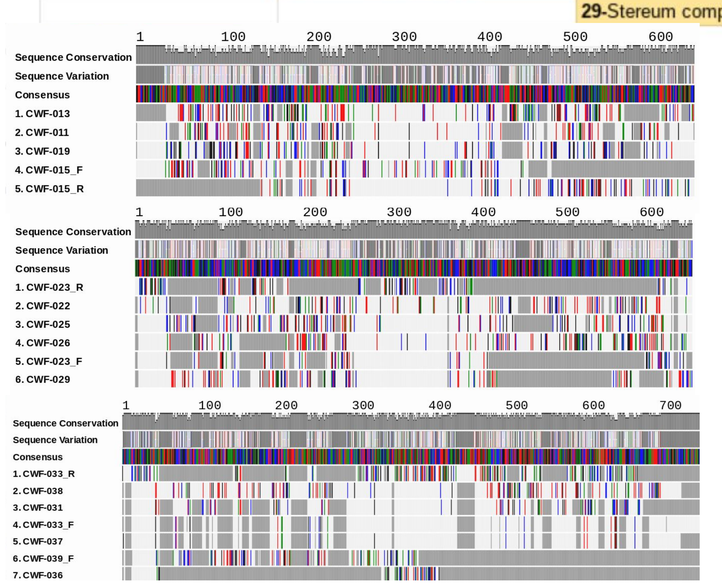
Used DNA Subway to sequence samples

Electrophoresis to see outcomes of PCR and strength



Tables & Figures

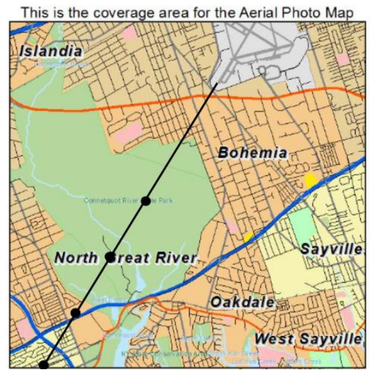
Location 1	Location 2	Location 3	Location 4
2-Hymenochaete rubiginosa	**11**-Pleosporales	**22**-Phialoseptomonium junci	**31**-Tremella macrobasidiata
	13-Iodophanus testaceus	**23F and R**-Tremella indecorata	**33F and R**-Sterigmatosporidium polymorphum/ Tulosesus maritimus
	15F and R-Stereum complicatum	**25**-Punctelia hypoleucites	**36**-Ganoderma lingzhi
	19-Teichospora quercus	**26**-Lecophagus longisporus	**37**-Sterigmatosporidium polymorphum
		29-Stereum complicatum	**38**-Mycena meliigena
			39F-Penicillium citrinum



Location #2

Location #3

Location #4



Location compared to MacArthur Airport

Sample CWF_025

Sample CWF_033

Discussion

- Inconclusive results
- Successful samples were unevenly located
- Was able to successfully barcode the actual lichen for sample 25
  - Many samples were barcoded as fungi because of the strong symbiotic relationship with algae
- Sample 33 had a different species matches for the forward and the reverse sequences
  -Lichens reproduce sexually via spores; when sequencing, certain bases from a parent may be more prevalent/stronger
  -The sample may be from two or more mixed sources. The forward/reverse primer could have worked more effectively with a specific species

References

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Acknowledgements

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