

Longwood HS Nature Trail Bioblitz: Plants



Abstract

Longwood High School is establishing a nature trail on the campus. The purpose of this project was to characterize the plant, moss, and lichen biodiversity in the nature trail. Twenty samples of representative plants, mosses, lichens and fungi were collected and their DNA was prepared using the Qiagen DNeasy Plant Pro Kit, followed by PCR using rbcl primer for plants and moss and ITS primer for lichens and fungi. The species detected were a mixture of native and European-introduced species. Most species were typical for those found in a pine barrens environment, with the exception of big sagebrush. These data will be used to develop a walking trail with species plaque identification. In addition, further studies of the species detected are planned to investigate their possible roles in the nature trail habitat.

Introduction

This research addresses the question of level of plant biodiversity within the new Longwood High School nature trail. Bioblitz are useful for initial characterization of species in an area (1). In this study, we asked the questions of whether plant, moss, and lichen species detected in this survey are consistent with a Northeastern pine barrens habitat, and we also analyzed the data to detect any invasive species (2-5).

Materials & Methods

- Twenty plant, moss and fungi samples were collected from various locations within the Nature Trail.
- DNA was extracted using the Qiagen DNeasy Plant Pro kit.
- PCR was performed using Illustra PuReTaq Ready-to-Go PCR beads, with rbcL primer for plants and ITS primer for fungi and lichens.
- DNA Subway program was used to identify the species, using the best matches delivered for each sequence.

Results

Species identified are pictured at the right. Most species are native to our area and typical for our local pine barrens habitat. One invasive species was detected in our survey (Mugwort, native to Europe) and East Asia).



(water pepper)



(Mugwort)



Discussion

In this study, we learned that most of the plant, moss, lichen and fungi species detected in the nature trail are typical for the pine barrens habitat of our new nature trail. Fungi such as spotted toughshank, milkcap; pincushion and sheet moss, ruffle lichen, and plants including switchgrass, pokeweed, goldenrod, water pepper, greenbrier, blackberry, English oak, and blueberry are found in other pine barrens habitats (5). One species were originally introduced by European colonists (water pepper) while one originated from Japan (mountain blueberry). One invasive species was detected (Mugwort, native to Europe and East Asia). These data will be used to design an interpretive species identification walking trail through the area. In addition, future research projects can by designed to focus on studying the adaptations of the individual species identified here.

References:

Acknowledgements:

We thank Cold Spring Harbor Barcoding Long Island scientists for their advice and technical assistance. We thank Dr. Aleida Perez at Brookhaven National Laboratory for guiding us through DNA preparation and PCR during the Open Lab Session.

Aamina Chaudhry¹, Lucinda Hemmick¹, Hussain Iqbal¹, Emi Ito¹, and John Meier¹ ¹Longwood High School, Middle Island, NY

Plants, Fungi, and Lichens Identified in Nature Trail

1. "DNA barcoding Brooklyn (New York): A first assessment of biodiversity in Marine Park by citizen scientists." PLOS ONE, July 18, 2018. 2. Invasive Plant Species Proliferation on Long Island. https://ccenassau.org/resources/-invasive-plants 3. Long Island Coordinated Invasive Plant Management Planhttps://www.invasive.org/gist/products/wma/li-plan.pdf 4.How Climate Change Affects New York's Plants and Animals https://news.climate.columbia.edu/2017/01/06/how-climate-change-is-affecting-new-yorks-plants-and-animals/ 5.<u>Invaders of Long Island</u>https://www.pinebarrens.org/bridge-to-the-barrens/invaders-of-long-island/



CSH Cold Spring Harbor Laboratory DNA LEARNING CENTER

