ST. MARY'S PARK INVASIVE SPECIES INVESTIGATION

What's In Your Neighborhood?

Afiwa Flora Afandalo, Andrew Shillingford, Yannelly Perez
Mentor: Patricia Pena Carty
University Heights High School

Funded by
The Thompson
Family Foundation

Abstract

The specific goal of this experiment is to find if any plants have been brought in from other countries. Because of the high immigrant population in the Bronx, we think that there is a high chance of finding some trees that have been brought here from overseas. Also to see if the plants coming from overseas is doing positive or negative harm to our community.

Introduction

New York City is a very diverse place, it's basically one big melting pot. The Bronx is a city of immigrants that is just as diverse as NYC. A big part of the Bronx is the plant and animal life that can be found here because the plant and animal life is just as diverse as the people. Since the population around St. Mary's park is highly diverse and full of immigrants we want to find out if there are any ground level plants that have also come from other countries that aren't the United States. Invasive species are non-native species. We are very excited to see what our experiment will prove.

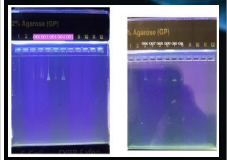
Materials and Methods

All samples were collected in the months of September, October, November from St. Mary's Park. A permit for sample collection was obtained from the NYC Parks Department. Samples were stored in ziploc bags, labeled with the GPS coordinates of where the sample was collected, and stored in a freezer. The standard DNA extraction method was utilized, using footlocker materials for the Cold Spring Harbor Laboratory PCR DNA extraction protocol lent out by the Harlem DNA Learning Center. Samples from the DNA extraction were mailed to a lab for sequencing. Results from those DNA sequences were

Results

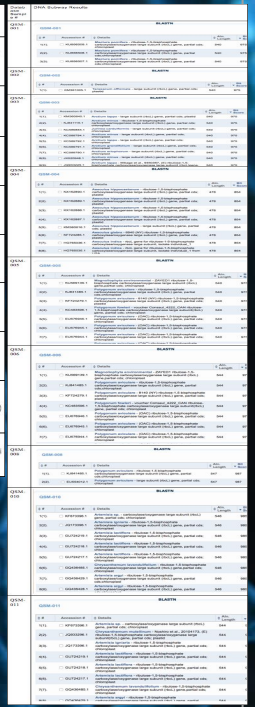
Sample	Species	Where Commonly Found in the World	Commonly Located in Temperate Deciduous Forest Climate	Invasive?
QSM-001	Maclura Pomifera (osage orange)	Mississippi River, Arkansas, Oklahoma, Louisiana	Yes	Non-invasive
QSM-002	Taraxacum officinale (dandelion)	Eurasia, Mexico, South America	Yes	Invasive*
QSM-003	Articum lappa (burdock)	Eurasia, North America	Yes	Non-invasive
QSM-004	Aesculus hippocastanum (horsechestnut)	South East Europe, Balkans	Yes	Non-invasive
QSM-005	Polygonum Aviculare (knotgrass)	Eurasia, North America	Yes	Non-invasive
QSM-006	Polygonum Aviculare (knotgrass)	Eurasia, North America	Yes	Non-invasive
QSM-008	Polygonum Aviculare (knotgrass)	Eurasia, North America	Yes	Non-invasive
QSM-010	Artemisia sp. (mugwort, wormwood, and sagebrush)	Eurasia, North America	Yes	Invasive**
QSM-011	Artemisia sp. (mugwort, wormwood, and sagebrush)	Eurasia, North America	Yes	Invasive**

*Global Invasive Species List, ISSG.
**New York Invasive Species List, Cornell University & SeaGrant NY.



Tables and Figures

Database Sample #	Date Collected And Location	Sample Image	Date Extracted	DNA Barcode Match	Origin of Species
QSM-001	October 28, 2016 40.8117° N, 73.9120° W		February 1, 2017	Reliable match 0 mismatches Bit-score 975	Arkansas, Louisiana, Oklahoma, Texas (USA)
QSM-002	October 28, 2016 40.8117° N, 73.9120° W		February 1, 2017	Reliable match 0 mismatches Bit-score 975	Europe
QSM-003	October 28, 2016 40.8117° N, 73.9120° W		February 1, 2017	Reliable match 0 mismatches Bit-score 975	USA
QSM-004	November 2, 2016 40.8117° N, 73.9120° W		February 1, 2017	Reliable match 0 mismatches Bit-score 854	Hungary (Europe)
QSM-005	November 2, 2016 40.8117° N, 73.9120° W		February 1, 2017	Reliable match 0 mismatches Bit-score 975	New England State (USA)
QSM-006	October 28, 2016 40.8117° N, 73.9120° W		February 3, 2017	Reliable match 0 mismatches Bit-score 973	Europe
QSM-008	October 28, 2016 40.8117° N, 73.9120° W		February 3, 2017	Reliable match 0 mismatches Bit-score 987	Europe
QSM-010	November 2, 2016 40.8117° N, 73.9120° W		February 3, 2017	Reliable match 0 mismatches Bit-score 985	Massachusetts (USA)
QSM-011	November 2, 2016 40.8117° N, 73.9120° W		February 3, 2017	Reliable match 0 mismatches Bit-score 982	Nebraska, Mississippi (USA)



Discussion

Three of the samples revealed barcodes for invasive plant species, QSM-002, -010, and -011. These plants were Taraxacum officinale (dandelion) and Artemisia sp. (mugwort). All plants were native to New York.

References

Bustamante, C. & Taylor, J. (2011). New York City: the ground zero of invasive species. Retrieved from http://econyc.journalism.cuny.edu/2011/05/20/new-york-city-the-nations-ground-zero-for-invasive-species/

Clinton, W. Department of Agriculture, (1999). Executive order 13112 Washington, DC: Retrieved from http://www.invasivespeciesinfo.gov/laws/execorder.shtml

Conservation issues: invasive species. (n.d) Retrieved from http://www.natureserve.org/conIssues/invasivespecies.jsp

Global Invasive Species Database (2017) Species profile: *Taraxacum officinale*. Downloaded from http://www.iucngisd.org/gisd/speciesname/Taraxacum+officinale on 15-04-2017.

Invasive Plant Council of New York State. Invasive Plant Council of New York State. N.p., n.d.: Retrieved from https://www.invasive.org/species/list.cfm?id=101

New York Invasive Species Research Institute. Cornell University, Sea Grant NY. Web. 12 Apr. 2017. Retrieved from http://www.nyis.info/

NY Department of Environmental Conservatism, Biodiversity and Species Conservation. (2011). *Sustaining New York's Plants,animals, and ecosystems* Albany, New York: Retrieved from http://www.dec.ny.gov/animals/279.html

Acknowledgements

We would like to thank the UHHS community for encouragement and support throughout this project. We also want to thank the Cold Spring Harbor Laboratory for giving us the opportunity to conduct these experiments by lending us the materials to do so.