URBANBARCODING SOUTH BRONX

INVASIVE SPECIES INVESTIGATION

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Plant # 1(Ballota Nigra)

Abstract

There are many invasive species in our environment. For this project we wanted to find out where the different plants originated from. Invasive species are considered to be a type of organism (either plant or animal) that is a threat to the earth's biodiversity. In this experiment we will be closely testing out different types of leafs and checking to see if they are harmful to our city. Plants tend to become harmful because they didn't originate from our city, meaning they came from another country and it might be harmful to this environment. Another way plants tend to become harmful is that they can interfere with the food web in an ecosystem by destroying or replacing native food sources. These invasive species may also grow uncontrollably in our environment.

Introduction

Invasive species are plants or animal species that have a tendency to spread to a degree believed to cause damage to the environment, human economy or human health. This then affects delivered food, fiber, pollination, etc. Our study is of scientific interest because invasive species affect our environment and if the environment is getting affected than humans are as well. We want to do this experiment because in almost every neighborhood there are so many invasive species. Our experiment looks into the origin of these species, and may potentially inform whether we need to advocate for some of these invasive species to be removed.

Plant # 2(Lamium Purpureum)

Materials

Materials used for the experiment:

- 10, 100, 1000ul pipettes
- Waterbath
- Styrofoam Rack
- Thermometer
- Invitrogen
- E-Gel
- Centrifuge
- Microcentrifuge Tubes
- Lysis Solution
- Silica Resin
- 12.5 ul Taq Mix
- 10.5 ul Primer Mix
- Gel Electrophoresis
- Ziplock bags
- scissors

Methods

1. Collect, document , and identify the specimen from around the South Bronx area
2. Isolate DNA from plant, fungal, and animal species and eliminate the supernatant from the DNA.
3. Amplify DNA by PCR reagents
4. Analyze PCR products by gel electrophoresis
5. Compare sequencing results to GenBank sequences of known species

Plant #1

#	Accession #	Details	Aln. Length	Bit Score	E #	Mis-matches
1(1)	gb|179817706|gb|KM360663	Ballota nigra - large subunit (rbcL) gene, partial cds, plastid	572	984	0.0	11
2(2)	gb|335577Sem6|Z37402	L.maculatum chloroplast - for rubisco (large subunit) (partial)	572	978	0.0	12
3(3)	gb|335577Sem6|Z37410	M.incanum chloroplast - for rubisco (large subunit) (partial)	572	978	0.0	12
4(4)	gb|335582Sem6|Z37408	M.parviflorum chloroplast - for rubisco (large subunit) (partial)	572	978	0.0	12
5(5)	gb|335582Sem6|Z37411	M.vulgare (3) - gene for rubisco (large subunit) (partial)	572	978	0.0	12
6(6)	gb|335582Sem6|Z37412	M.vulgare (3) - gene for rubisco (large subunit) (partial)	572	978	0.0	12
7(7)	gb|1085882038|gb|AB266224	Lamium purpureum - gene for ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit, partial cds, specimen, voucher=Jap3678 BC (Herbarium Bugnenas)	572	978	0.0	12
8(8)	gb|179820568|gb|KM360839	Lamium galeobdolon - large subunit (rbcL) gene, partial cds, plastid	572	978	0.0	12
9(9)	gb|335581Sem6|Z37464	S.sylvatica chloroplast - for rubisco (large subunit) (partial)	571	976	0.0	12
10(10)	gb|2208121526|rbcL|S13159	Leonurus sibericus - large subunit (rbcL) gene, partial cds, chloroplast	571	976	0.0	12
11(11)	gb|358411706|gb|HQ639683	Leonurus sibericus - ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit (rbcL) gene, partial cds, chloroplast	571	976	0.0	12
12(12)	gb|358411764|gb|HQ639687	Leonurus sibericus - ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit (rbcL) gene, partial cds, chloroplast	571	976	0.0	12
25(25)	gb|449587.2|gb|U81873	Galeopsis tetrahit chloroplast ribulose-1,5-bisphosphate carboxylase/oxygenase large	571	971	0.0	13

Plant #2

KEH-054-F

#	Accession #	Details	Aln. Length	Bit Score	E #	Mis-matches
1(1)	gb|1106599203|dbj|AB266225	Lamium purpureum - gene for ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit, partial cds, specimen, voucher=Jap3678 BC (Herbarium Bugnenas)	572	1032	0.0	0
2(2)	gb|335577Sem6|Z37403	L.purpureum chloroplast - for rubisco (large subunit) (partial)	572	1027	0.0	1
3(3)	gb|335577Sem6|Z37402	L.maculatum chloroplast - for rubisco (large subunit) (partial)	572	1023	0.0	2
4(4)	gb|335577Sem6|Z37410	M.incanum chloroplast - for rubisco (large subunit) (partial)	572	1014	0.0	4
5(5)	gb|335582Sem6|Z37409	M.parviflorum chloroplast - for rubisco (large subunit) (partial)	572	1014	0.0	4
6(6)	gb|335582Sem6|Z37411	M.vulgare (3) - gene for rubisco (large subunit) (partial)	572	1014	0.0	4
7(7)	gb|335582Sem6|Z37412	M.vulgare (3) - gene for rubisco (large subunit) (partial)	572	1014	0.0	4
8(8)	gb|179820568|gb|KM360839	Lamium galeobdolon - large subunit (rbcL) gene, partial cds, plastid	572	1014	0.0	4
9(9)	gb|335581Sem6|Z37464	S.sylvatica chloroplast - for rubisco (large subunit) (partial)	571	1012	0.0	4
10(10)	gb|1106599222|dbj|AB266225	carboxylase/oxygenase large subunit,	572	1005	0.0	6
25(25)	gb|449587.2|gb|U81873	Galeopsis tetrahit chloroplast ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit (rbcL) gene, partial cds, chloroplast gene for chloroplast product	571	960	0.0	7

Results

Plant 1:Ballota nigra / black horehound that is a Perennial herb of the family Lamiaceae that can be found throughout Europe. It is also native to the Mediterranean region and to central Asia, and it can be found throughout Europe. It is also naturalized in Argentina, New Zealand, and the Eastern United States. It blooms in the Northern Hemisphere from May to August.

Plant 2 :Lamium Purpureum also called the red, purple dead-nettle, purple archangel or velikden. This herbaceous flowering plant is native to Europe and Asia.

Our hypothesis was supported because each of the plants came from a different place in the world.

Discussion

This Urban Barcoding Project was design to see where invasive species migrated from. In our experimentation we were able to prove that invasive species did come from Europe, Japan, and Korea. Invasive species arrived to the United States by different modes of transmission, for example birds, wind, and people who carry seeds on their clothing, in suitcases, among others different ways by which invasive species got to the United States, and ultimately our South Bronx community.

References

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