BIODIVERSITY AND EFFECTS OF INVASIVE WEEDS AND GRASSES IN OUR NEIGHBORHOOD

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Abstract

Invasive grass and weeds are those that can engulf other plants that are in that area. However, does a drastically different stimulating environment encourage biodiversity of invasive plants? Hence, this study aimed to correlate human activity to the biodiversity of invasive plants. Different samples are collected from different neighborhoods; Cityline (busy neighborhood) and Bayridge (quiet neighborhood). It is expected that Cityline will have more stimulants due to traffic and human activity to result in less biodiversity. The significance of finding biodiversity leads to a better understanding of the bioindicator that presents the quality of the environment. DNA barcoding is a method that can be used to identify invasive species of grass and weeds using a short genetic region as a barcode. Cityline had high amounts of Festuca Gigantea while Bayridge had diverse amounts of grass species found, which shows biodiversity is greater in Bayridge.

Introduction

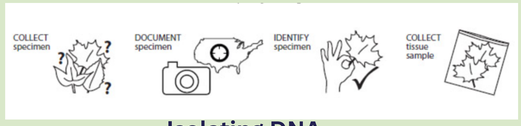
The invasive species of grasses and weeds are overtaking areas of neighborhoods where space can be given for other plants to thrive. The U.S. Department of Agriculture had listed different types of grasses and weeds as invasive to the environment. The grasses and weeds that are invasive are those that are overgrowing and spilling onto curbs and sidewalks. Taking samples of them not only helps us identify biodiversity but also helps clear up space for more biodiversity for other plants. DNA barcoding is a system for identification focused on the use of a short, genetic region acting as a “barcode.” Using DNA barcoding to assess what species of grass or invasive weeds are in our environment is a clever example of DNA barcoding to educate high school students. This procedure can help others understand the significance of biodiversity and the environment through this study. We will be collecting samples from our different neighborhoods, Cityline and Bayridge, to imitate what would make the grasses and weeds distinct if they were from different environments. This discovers if different species of grass and weeds grow in distinct environments and how biodiversity plays a role even in the same type of organism, like grasses, and how they can differ. The environment affects the species and growth of the weeds. If the environment is diverse, then the growth and species of the plant will be different. Our hypothesis is that if an environment is less busy with stimulants, it will be more diverse in species of invasive grasses and weeds because it has more space to thrive.

Material and Method

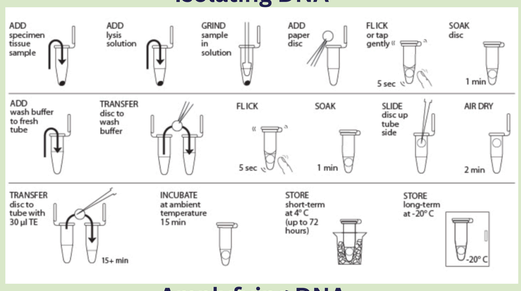
Of the grasses and weeds. The distinct neighborhoods that we live in can affect the growth or species of grasses and weeds. The dependent variable of our experiment is the growth and species of the grasses and weeds. The environment impacts the growth of these weeds. The constant in this experiment is that all of our samples will be collected at the same time during the winter. Another constant is when the general temperature is the same when we collect the samples as well. We will also freeze these samples at the same temperature. For our experiment, we don’t necessarily have a control group because there isn’t a neutral environment in our neighborhoods. We will be collecting samples from our different neighborhoods to imitate what would make the grasses and weeds distinct if they were from different environments. To collect our specimen, we are going to individually extract small amounts of weeds and grasses and place them into plastic zip-top bags. Using weeds and grasses from our different neighborhoods to fit the biodiversities of distinct regions and areas. The neighborhoods that we are going to visit are Cityline and Bayridge. Cityline, a busy and bustling neighborhood; and Bayridge, a quiet and calm suburb. From these two locations, a total of 30 small samples of grass will be collected—15 from each neighborhood—and then put into a zip-lock bag. Cityline samples will be labeled YMJ-001-YMJ-015, and Bayridge samples will be labeled YMJ-016-YMJ-030. The materials used in this study are: leaves and weeds, mortar and pestle, beakers, water, filter, salt, electronic scale, centrifuge tubes, micropipette, buffer, and centrifuge.

Procedure

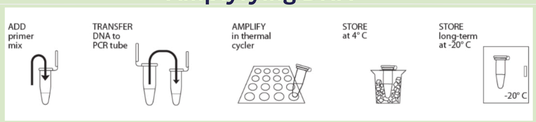
Collecting Specimen



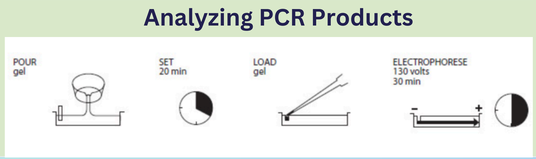
Isolating DNA



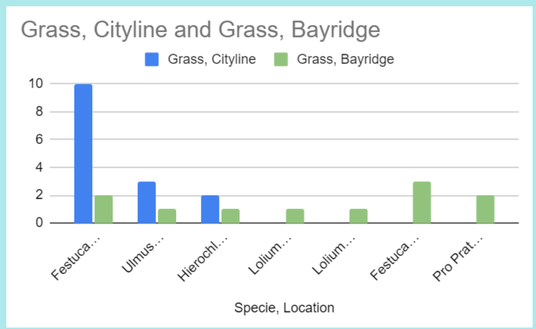
Amplyfying DNA



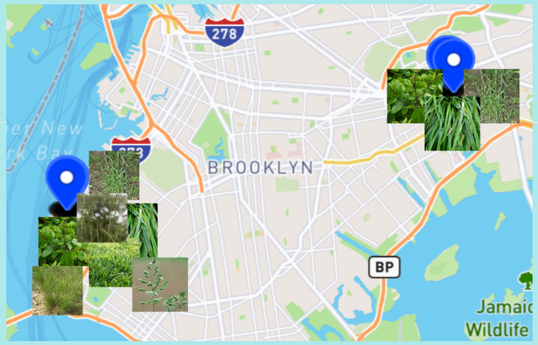
Analyzing PCR Products



Results



Based on the number on the numbers collected that were sequenced sucessfully.



The map below shows the difference in grass species found in the two different locations.

Discussion

The results show that there is a significantly greater amount of diversity in Bay Ridge when it comes to different species of grasses and weeds. The grasses in Bay Ridge have a total of four more species than Cityline did not have at all. Cityline also had high amounts of Festuca gigantea, while Bayridge had a diverse amount of every type of grass species found. These results show that there is more biodiversity in Bayridge, a quiet neighborhood. This proves our hypothesis to be true: Bayridge would have more biodiversity due to having fewer stimulants in its environment. This means that environments where they are less busy have less bioindicators because of the variety of plants that are able to thrive in them. While the study resulted in our expected results, there can be improvements for future research. One error that can be fixed is getting grass samples from more locations in busy and quiet neighborhoods to give a more solid and accurate result. Our data is still too weak to support our hypothesis strongly, and more research has to be done to fully confirm that this pattern is seen in other data. Another limitation was not getting all the samples back for Bayridge, which might have shown more species from grass or weed. If these errors are corrected in future studies, it can help support the correlation between grass and weed biodiversity in different environments.

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