TREE COMMUNITY MAKEUP & BIODIVERSITY SUPPORT LEVELS

A Comparison of Black Rock Forest to New York City Street Trees

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Introduction

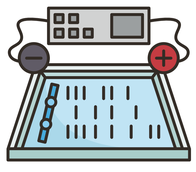
Across New York City, new trees are planted every year as old ones die and are cut down, and they are selected based on their ability to survive in the harsh city environment. In contrast, Black Rock Forest's trees have been protected for over a hundred years from excessive human impact. While there is a available knowledge about trees and soil in NYC and BRF respectively, there is not a lot of information comparing the two locations. In both of these locations, trees act as vital ecological hubs for biodiversity, providing habitats food sources, and protection for a range of species.

Methodology

01 Collecting leaves and abiotic factor data from trees in both locations

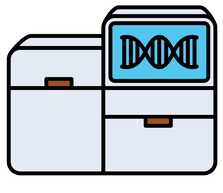
02 Running gel electrophoresis

03 PCR tests



04 DNA sequencing

05 BLAST comparisons



Results

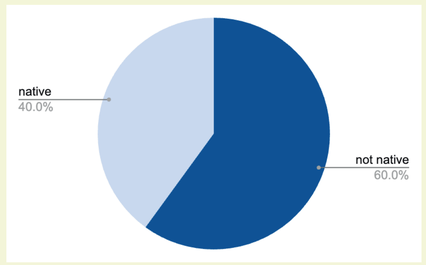


Figure 1: Pie graph showing the percentage of native species compared to non-native species in NYC (n=5).

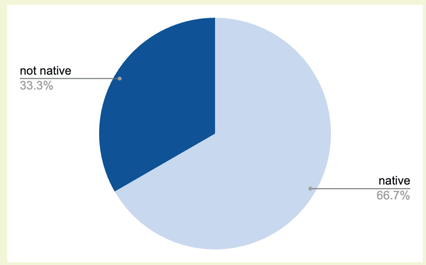


Figure 2: Pie graph showing the percentage of native species compared to non-native species in BRF (n=6).

Figure 3: Bar graph comparing average pH values in BRF vs. NYC (n=6) for each.

Figure 4: Bar graph comparing average salinity values in BRF vs. NYC (n=6) for each.

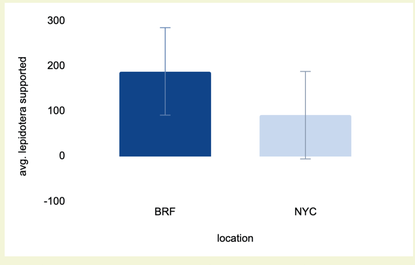


Figure 5: Bar graph comparing average number of Lepidotera species supported in BRF vs. NYC (n=6) for BRF, and (n=5) for NYC.

Objective

The goal of this project is to investigate the differences between trees in BRF and NYC, relating the different species to the pH and salinity of the soil around each tree. Our hypothesis is that Black Rock Forest will exhibit a more diverse and native tree population while NYC tree boxes will contain a population with a higher percentage of non-native and pollution-tolerant trees. In addition, trees in Black Rock Forest will support a greater number of Lepidoptera species than urban trees. We have decided to investigate the projected values of Lepidotera (butterfly species) in both locations as Lepidotera is often used as a proxy for biodiversity.

Discussion

Comparisons between figures 1 and 2 reflect that BRF contains a higher percentage of native species than NYC, as we predicted. This information suggests that BRF is more likely to support biodiversity within the area than NYC, and corresponds with the difference in Lepidotera numbers. Figure 3 depicts NYC having a more acidic pH value than BRF. Previous studies have shown that acidic pH values result in supressed ecosystem functions, signifying that NYC likely has experienced negative ecosystem effects, and a decrease in biodiversity. Figure 4 depicts NYC having a significantly higher salinity value than BRF. Existing literature has shown that high salinity levels result in high biodiversity losses, indicating that NYC is more likely to experience these losses. Lastly, figure 5 depicts Black Rock Forest supporting a significantly higher amount of Lepidotera species than NYC, likely a reflection of the pH, salinity, and native species data, which means BRF is likely to support higher amounts of biodiversity.

Future research

Future research could include comparing other crucial ecological systems in BRF and NYC, such as fungal and bacterial communities. Additionally, investigating past pH, salinity, and tree species data from both BRF and NYC, would help further understand how changes in these specific areas have altered biodiversity levels.

Key Sources & Acknowledgements

References

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