Plant Biodiversity in Green-Wood Cemetery and Prospect Park

Camille Gauthier, Aurelia Mentzer, Henry Tangney, Dr. Nicholas Harbison

Saint Ann's School 129 Pierrepont Street Brooklyn, NY 11201

Funded by the Thompson Family Foundation

Abstract

Cemeteries take up quite a bit of land in New York City, but we have not found a lot of research on how they affect plant life. We aim to look at the difference between plants growing in cemeteries versus parks. We plan to sample plant life from both cemeteries and parks, taking particular note of areas with headstones. Eventually, we hope to shed light on the effects of different environments on the biodiversity of our city.

Introduction

Underdeveloped land is very rare in an urban setting, and even parks tend to be very much controlled by humans using chemicals. Cemeteries host many different flora and fauna and could serve as a haven from threats such as habitat destruction, invasive species, and pollution.

Materials & Methods

We selected two distinct locations for sample collection: Prospect Park and Green-Wood Cemetery. After collecting three samples from each location, we moved on to analysis. We used a rapid DNA extraction protocol[7] to isolate the DNA. Isolates underwent PCR to amplify the rbcL gene. PCR products were sequenced (Figure 1) and analysis performed.

Results

The graveyard results (KQR-001, KQR-003, KQR-005) are functionally identical. The results from Prospect Park (KQR-002, KQR-004, KQR-006) are more varied. KQR-004 and KQR-006 are relevantly similar, but KQR-002 shows more differences. The untouched area has a little more biodiversity compared to the other graveyard sites. Sequence of the 50 year old site and the 100 year old site are identical.

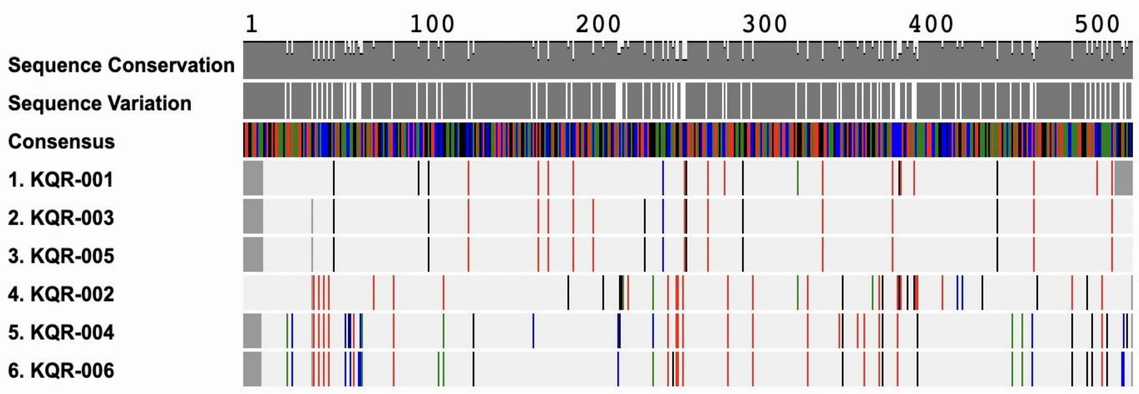

Figure 1: Sequence alignments for samples

References

1. *Cemeteries in the City Plan. (n.d.). American Planning Association. https://www.planning.org/pas/reports/report16.htm*
2. *Biodiversity potential of burial places – a review on the flora and fauna of cemeteries and churchyards. (2019). Global Ecology and Conservation, 18, e00614. https://doi.org/10.1016/j.gecco.2019.e00614*
3. *DNA Learning Center Barcoding 101. (n.d.). Dna Barcoding 101.org. https://dnabarcoding101.org/resources/*
4. *Kowarik, I., Buchholz, S., von der Lippe, M., & Seitz, B. (2016). Biodiversity functions of urban cemeteries: Evidence from one of the largest Jewish cemeteries in Europe. Urban Forestry & Urban Greening, 19, 68–78*
5. *Olmsted–Designed Parks : NYC Parks. (2019). Nycgovparks.org. https://www.nycgovparks.org/about/history/olmsted-parks*
6. *Biodiversity & Species Conservation - NYSDEC. (n.d.). Dec.ny.gov. https://dec.ny.gov/nature/animals-fish-plants/biodiversity-species-conservation*
7. *Rapid DNA isolation*. (n.d.). https://dnabarcoding101.org/lab/ protocol-2.html#standard

Discussion

The untouched area is able to flourish without any (dead stuff affecting it)

Due to the lack of sequencing variation among the 50 year old site and the 100 year old site, it is possible that not enough time has passed for the grass to be affected by any degradation.

For the gravestone grass, a chemical analysis may help show why the untouched area's DNA is different from the other hedgestone areas.

Acknowledgements

We are grateful to the DNA Learning Center - UBP staff, Cold Spring Harbor Labs and to Saint Ann's science department, without whose assistance this project would not be possible. We also thank Green-Wood Cemetery.