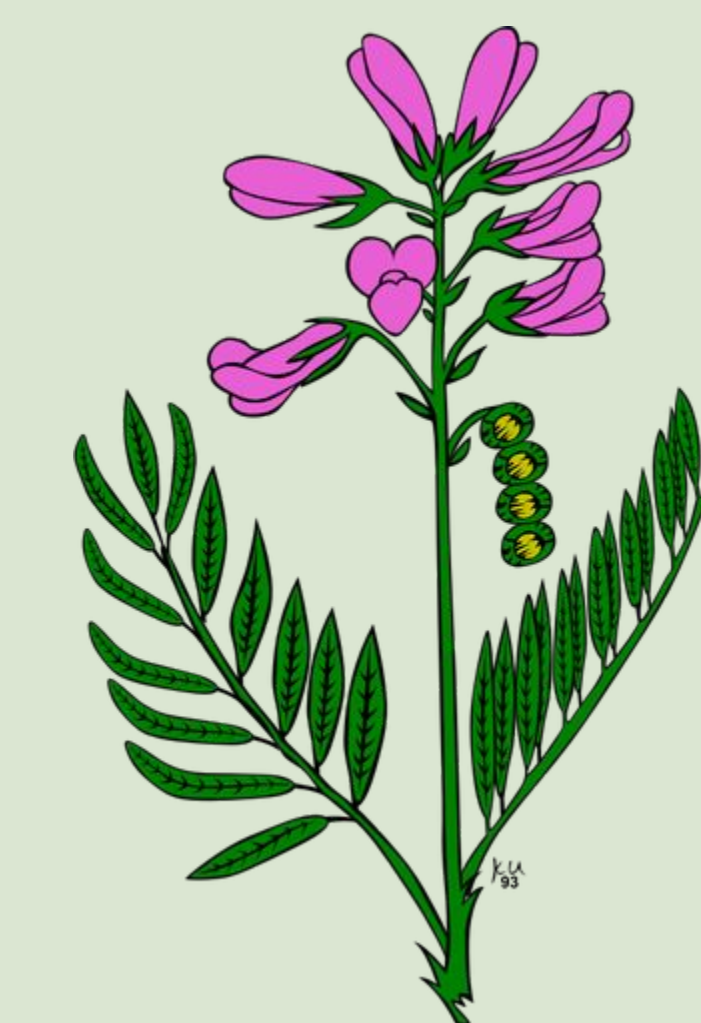


Impact of American Pokeweed Density on Biodiversity in NYC Parks



Question

How does the amount of American Pokeweed in the environment affect the biodiversity within an environment and ecosystem?

Introduction

American Pokeweed is a 4 to 10 foot tall natural herbaceous perennial in the Phytolaccaceae family. This poisonous plant, which dies down to its extremely huge taproot each winter and re-emerges each spring, stood out to the team since there was such an abundance of it in Prospect Park. This plant made us consider its impact on NYC parks ecosystems and biodiversity, due to its variance in both beneficial and harmful effects.

Background

American pokeweed, a striking perennial, boasts tall stems, large leaves, and clusters of deep-purple berries. Despite its toxicity, Native Americans once utilized its roots for medicinal purposes. In addition, the toxic berries, while a food source for some birds, can be harmful to others, potentially affecting avian populations. Its rapid growth and dense foliage may outcompete native vegetation, altering the composition of plant communities. And, the plant's presence may influence the abundance and diversity of insect species. Therefore, managing pokeweed abundance is crucial to maintaining a balanced and diverse ecological community.

Method

As a method of data collection, we used iNaturalist. Using the map option on iNaturalist, we decided on collecting data on small sections of Central Park and Prospect Park, writing down the American Pokeweed population, as well as overall sighting of species. We fully evaluated all possible locations in the two parks to ensure there was no biased data collection. We selected a consistent sizing circle on iNaturalist and wrote down the number of American Pokeweed plants present in that circle. To make sure the ratio was as accurate as possible, we then selected all biodiversity, which included every single sighting of any kind of species in that area. Moving forward we continued moving that circle, taking down over 80 data points for research analysis. and Afterwards, we calculated the correlation coefficient using American Pokeweed and biodiversity in the two parks to find a connection to a relationship between the variables. By collecting this data, it allowed us to see whether American Pokeweed had any effect on biodiversity within an environment.

Conclusion

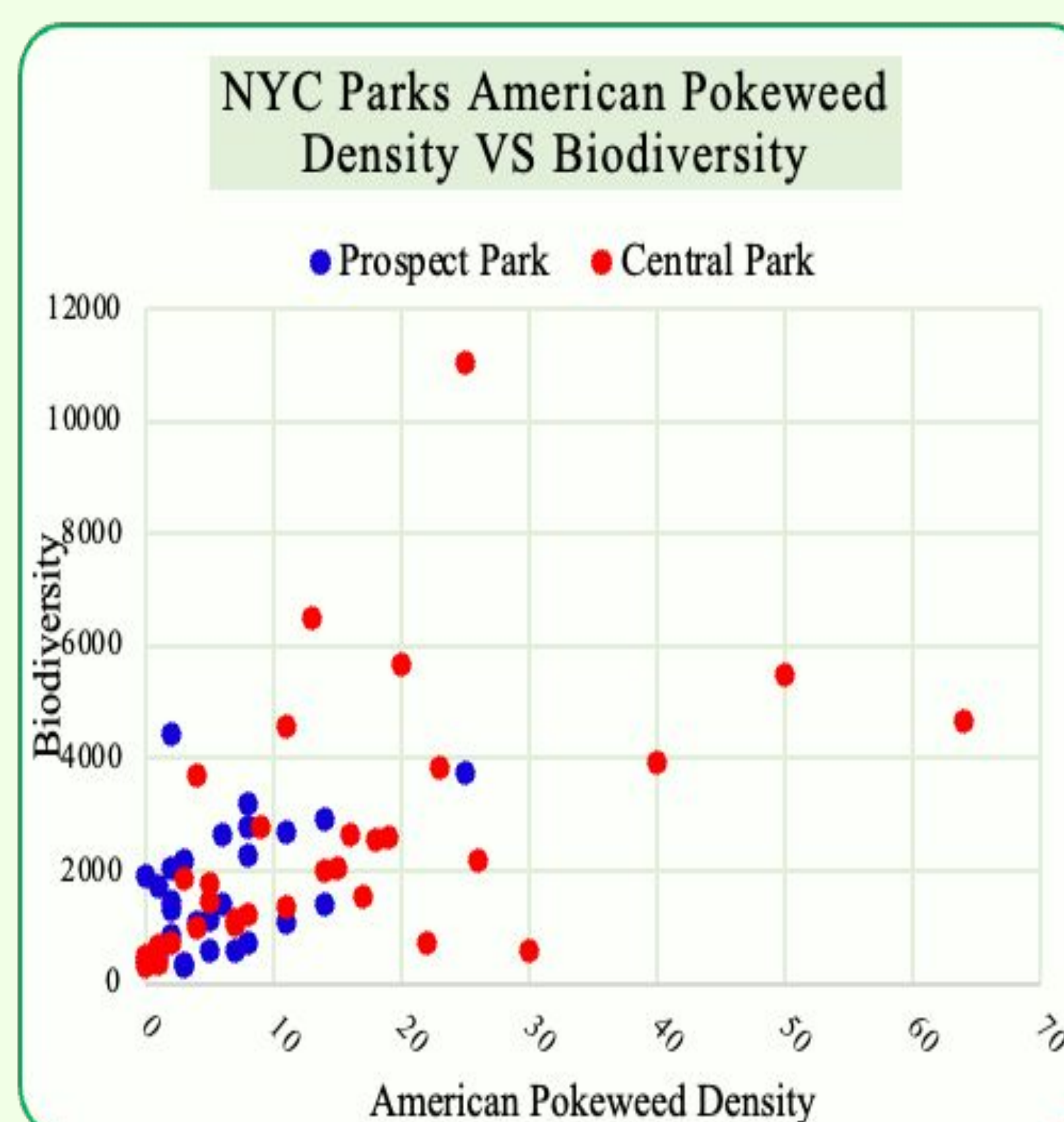
Although American Pokeweed tends to have an impact on its surrounding biodiversity due to its ability to provide sustenance for species around it, we were unable to discover a strong relationship between the plant and its surrounding ecosystem. The presence of a weak correlation between the Pokeweed density and biodiversity, although seems promising, can be subject to more testing and research.

Limitations and Future Steps

Regardless of slight evidence of a relationship between the variables, it is impossible to make a certain conclusion due to various factors playing into the survival and development of those species. In addition, the reliance on iNaturalist limits this research into progressing, due to a possibility of inaccurate information presented on the website, as well as the fact that not all species are reported Overall, in order to conduct an accurate study on this topic in the future, there needs to be an isolated long term study conducted in a controlled environment. One possibility would be to study a human made park with a high concentration of American Pokeweed to study the fluctuation of all other species numbers.

Results & Analysis

Measuring the correlation between NYC Parks American Pokeweed density, compared to the biodiversity overall showcases a weak positive correlation between the two variables. As concluded, the correlation coefficient in regards to Central Park is approximately 0.49 and r^2 is 0.2436, compared to the Prospect Park measurement of r 0.42 and r^2 being 0.1773.



Although the correlation tends to be very weak, it still depicts some sort of relationship between the two variables. In addition, this same correlation is faintly present in the two charts, as it depicts a slight increase in biodiversity and density at the same time. It is also important to note how r^2 for both parks was above the 1 bound.

***This scatter plot depicts each of the data points taken from Central Park and Prospect Park that compare total number of American Pokeweed in a given area to the total number of species sightings in that space. This plot showcases the weak positive correlation between the two variables.

References

- "U.S. Forest Service." *Forest Service Shield*, Pictures: animated.trees.com
- www.fs.usda.gov/wildflowers/plant-of-the-week/phytolacca_americana.shtml.
- "American Pokeweed Observations." iNaturalist, www.inaturalist.org/observations?taxon_id=48599.
- "Biodiversity Observations." Naturalist, www.inaturalist.org/observations.

