How does the use of pesticides affect the biodiversity of ant species located on residential properties in Northport, New York?

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ABSTRACT

Ant species play an essential role in balancing the ecosystem. This experiment was designed to study the differences in biodiversity of ants on residential properties that use pesticides, as well as those that do not. Our hypothesis was that lawns treated with pesticides would have less ant biodiversity than those that do not. After identifying the species in the DNA Subway, we were unable to make a clear correlation between the ant species biodiversity and the usage of pesticides..

INTRODUCTION

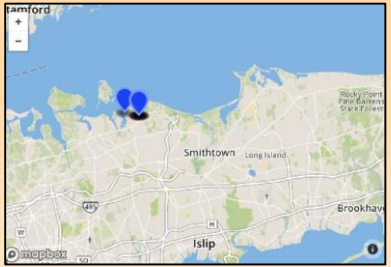
- The aim of our research project is to determine if there could be negative impacts from pesticides on the biodiversity of ants, since they place an essential role in balancing the ecosystem.
- Previous research projects regarding pesticides and biodiversity have focused on species not targeted by the pesticides such as birds, mammals, butterflies, spiders, and moths (Isrenring 2018).
- Since ants are one of the species specifically targeted by pesticides, we were wondering if not only the harmful ants were diverted, but the beneficial ones as well.

METHODOLOGY

- Collect specimens from 4 different homes in Northport, NY (Homeowners were given a survey to clarify if and or which pesticides were used on their property).
- Place 5x5 markers on the residents' lawns with a cookie (Pecan Sandies) and/or a potato chip (Wise) in the middle.
- Sorting the ants by location, photographing and analyzing ants in our homes due to the COVID pandemic.
- Perform Rapid DNA Isolation with tools provided by the Dolan DNALC, and sending isolated DNA to CSH Lab to run Gel Electrophoresis.
- Send Gel Electrophoresis results for sequencing and analyze data in the DNA Subway.

RESULTS

House Number	Pesticides	Reason for Pesticide Usage	Number of Species	Ant Species Identified
1	None	N/A	2	***Prenolepis imparis, Lasius neoniger***
2	Dylox 6.2 Insecticide	Grubs, Ants,	1	***Lasius neoniger***
3	None	N/A	1	***Lasius neoniger***
4	Prodiamine 2,4-D Herbicides	Crabgrass, Weeds	1	***Tetramorium caespitum***



DISCUSSION

- **Importance:** A significant difference between the biodiversity of lawns that had pesticide treatments versus those that did not is represented in our findings.
- The only residence with more than one species found was a lawn that did not use pesticide treatment. This was also the only lawn that contained the species *Prenolapis imparis*, which is important to the ecosystem due to its assistance in seed dispersion(Gaddy 1986).
- However, the COVID pandemic put limitations on this project as to the number of ant sample we were able to sequence.
- It needs to be considered that the lawn with the greatest number of species had the greatest number of samples sequenced.
- Therefore, this experiment would need to be carried out with a greater sample size for each lawn to verify the conclusion to our results.

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REFERENCES

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