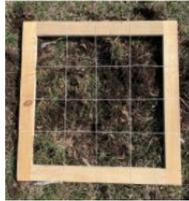


# Biodiversity of Long Island Superfund Sites: DNA barcodes of insects collected at two superfund sites

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## Discussion

Our combined results suggest that Superfund sites have a negative effect on the biodiversity of living organisms. The toxic wastes and substances that have accumulated over the years have created barren patches of land that cannot support life. There were very few samples to be found, at Sunny's and Sophia's sites, and at Mary's, where none at all were found. Furthermore, we calculated an 89% difference in biodiversity between the contaminated and non contaminated sites. This reinforces our hypothesis that states Superfund sites are toxic areas that negatively affect growth and survival of any life. They can damage their areas for a long period of time, and possibly even permanently, as it is very difficult for life to grow back after so much damage. The toxicity has seeped into the environment and infected it with infertility, taking away the ability to sustain life.

## Acknowledgements

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## References

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## Abstract

Of the 256 superfund sites on Long Island, our group went to 3 sites and observed the biodiversity with a quadrant study (Healy). Contaminated locations present a danger to all living species. We studied the effect superfund sites had on the biodiversity of insects in a superfund site. Comparing it to quadrant results of a non-superfund site in the same area, we observed the percent difference in insect biodiversity between the superfund and non superfund quadrant studies. We also barcoded any insects we could find to see what insects would survive on the superfund site.

## Introduction

Our hypothesis was that the sites with contaminated soil will have 50 percent less invertebrate biodiversity due to the toxic chemicals in the soil and groundwater. The presence of specific chemicals like cyanide, chromium, lead and other volatile chemicals in the ground affect the ability of life because of their toxicity and insecticidal properties (Anchor Chemicals). Our study will attempt to demonstrate how factories and facilities that contaminate the environment around them affect insect biodiversity with a quadrant study that will show the average population of insects in a contaminated area, and an uncontaminated area that will serve as a control to show how abundant insects are in the area when they live without contaminants. Additionally, we will barcode the insects found in the superfund site to understand what species will be able to live in these conditions.

## Materials and Methods

To compare biodiversity of both sites, we used a quadrant, which was a wooden square that measured 2ft by 2ft and contained a 4x4 grid. We used this to map out our samples and record the samples found in each box. For all the samples found on the superfund site, we collected them and barcoded them at school.

## Results

We found that superfund sites have an average of 80% less biodiversity than a regular site, which is 30% less biodiversity than we originally predicted. Our barcoding results showed that the examples of species able to survive in that environment are *Lasius claviger* (yellow ants) and *Prenolepis imparis* (winter ants). We conclude our findings with the statement that superfund sites significantly decrease the biodiversity of insects which creates a negative impact on the environment.

BLASTN

XNN-001 = back

# #	Accession #	# Details	Aln. Length	Bit Score	E #	Mis-matches
1(1)	<input type="checkbox"/> MN12938.1	<i>Lasius claviger</i> - <i>Lasius claviger</i> isolate DNAS-388-551F cytochrome c oxidase subunit 1 (COI) gene, partial cds	670	1209	0.0	0
2(2)	<input type="checkbox"/> MT215594.1	<i>Lasius claviger</i> - <i>Lasius claviger</i> isolate DNAS-428-6FEY cytochrome c oxidase subunit 1 (COI) gene, partial cds	666	1193	0.0	2
3(3)	<input type="checkbox"/> LT97474.1	<i>Lasius interjectus</i> -	658	1187	0.0	0
4(4)	<input type="checkbox"/> HQ97899.1	<i>Lasius claviger</i> - <i>Lasius claviger</i> voucher BIOUG-CANb-TDWS-0462 cytochrome oxidase subunit 1 (COI) gene, partial cds	658	1178	0.0	2
5(5)	<input type="checkbox"/> HQ97884.1	<i>Lasius claviger</i> - <i>Lasius claviger</i> voucher BIOUG-CANb-TDWS-0467 cytochrome oxidase subunit 1 (COI) gene, partial cds	658	1178	0.0	2
6(6)	<input type="checkbox"/> KR88823.1	<i>Lasius claviger</i> - <i>Lasius claviger</i> voucher BIOUG0140-C01 cytochrome oxidase subunit 1 (COI) gene, partial cds	658	1173	0.0	3
7(7)	<input type="checkbox"/> JN289077.1	<i>Lasius sp.</i> ASGLE467.10 - <i>Hymenoptera</i> sp. BOLD:AAC8342 voucher BIOUG-CANb-ASGLE467 cytochrome oxidase subunit 1 (COI) gene, partial cds	658	1173	0.0	3
8(8)	<input type="checkbox"/> MH396001.1	<i>Lasius claviger</i> - <i>Lasius claviger</i> isolate DNAS-228-226534 cytochrome c oxidase subunit 1 (COI) gene, partial cds	655	1173	0.0	2



BLASTN

XNN-006 = back

# #	Accession #	# Details	Aln. Length	Bit Score	E #	Mis-matches
1(1)	<input type="checkbox"/> MW20444.1	<i>Prenolepis imparis</i> - <i>Prenolepis imparis</i> isolate DNAS-556-6T1J cytochrome c oxidase subunit 1 (COI) gene, partial cds	687	1227	0.0	1
2(2)	<input type="checkbox"/> MK037286.1	<i>Prenolepis imparis</i> - <i>Prenolepis imparis</i> voucher 2812_SIEHA_TA_001 cytochrome oxidase subunit 1 (COI) gene, partial cds	682	1218	0.0	1
3(3)	<input type="checkbox"/> MT192796.1	<i>Prenolepis imparis</i> - <i>Prenolepis imparis</i> isolate DNAS-428-6FEY cytochrome c oxidase subunit 1 (COI) gene, partial cds	670	1200	0.0	0
4(4)	<input type="checkbox"/> HQ978935.1	<i>Prenolepis imparis</i> - <i>Prenolepis imparis</i> voucher BIOUG-CANb-TDWS-0587 cytochrome oxidase subunit 1 (COI) gene, partial cds	659	1180	0.0	0
5(5)	<input type="checkbox"/> HQ978901.1	<i>Prenolepis imparis</i> - <i>Prenolepis imparis</i> voucher BIOUG-CANb-TDWS-0485 cytochrome oxidase subunit 1 (COI) gene, partial cds	659	1180	0.0	0
6(6)	<input type="checkbox"/> HQ978878.1	<i>Prenolepis imparis</i> - <i>Prenolepis imparis</i> voucher BIOUG-CANb-TDWS-0461 cytochrome oxidase subunit 1 (COI) gene, partial cds	659	1180	0.0	0
7(7)	<input type="checkbox"/> HQ978843.1	<i>Prenolepis imparis</i> - <i>Prenolepis imparis</i> voucher BIOUG-CANb-TDWS-0392 cytochrome oxidase subunit 1 (COI) gene, partial cds	659	1180	0.0	0