# The Demographics of Leeches in Van Cortlandt Park

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Funded by the
Thompson Family Foundation

## Abstract

Every species of leech occupies a different niche in their ecosystem. As such, finding which species of leech presides in a community of organisms is vital to understanding their role. This experiment sought to find out which species of leeches reside in Van Cortlandt Park. Out of 30 leeches collected, the species of eight leech specimens were identified. *Helobdella modesta* was the most commonly identified leech species collected. Two leech species were identified, *Helobdella modesta* and *Helobdella robusta,* along with two snail species, *Helisoma anceps* and *Menetus dilatatus*. Overall, the results of this experiment give us a more complete understanding of the ecosystem in Van Cortlandt Park.

## Introduction

- Leeches have had many uses throughout history because of their blood sucking ability
- Leeches occupy an important niche in any ecosystem as both predators and prey
- They belong to the family *Oligochaetes*, they are segmented worms with 34 different body sections
- Leeches breathe through their skin and are hermaphroditic
- They live on land and in the water
  - In Van Cortlandt Park, they live in Van Cortlandt Park Lake and Tibbett's Brook, and they live in many different habitats within these locations
- Van Cortlandt Park has a very fragile ecosystem
  - There needs to be a full idea of all of the species in Van Cortlandt Park, and this experiment is one step towards that
  - There are over 650 different species of leeches worldwide, and they are nearly impossible to discern from each other based on looks alone, so this experiment is necessary to determine which species of leeches live in Van Cortlandt park
- This experiment will study leech diversity in Van Cortlandt Park by collecting samples from the Van Cortlandt Park Lake and sequencing their DNA.

## Results

| Sample Number | Species Name |
|---|---|
| KJS-002 | *Helobdella modesta* |
| KJS-003 | Unidentified |
| KJS-005 | *Helobdella modesta* |
| KJS-008 | *Helobdella robusta* |
| KJS-009 | Unidentified |
| KJS-010 | Unidentified |
| KJS-011 | *Helobdella modesta* |
| KJS-012 | *Helobdella modesta* |
| KJS-013 | *Menetus dilatatus* |
| KJS-014 | *Helisoma anceps* |
| KJS-015 | Unidentified |
| KJS-018 | *Helobdella modesta* |
| KJS-019 | Unidentified |
| KJS-024 | Unidentified |

**Table 1. The Species Names of Sequencing Leech Specimens**. This table displays the samples sent for sequencing. The sample number was created by DNA Subway to uniquely identify the samples in this experiment. The samples deemed "unidentified" either had too short of a sequence or too many mismatches in their sequence.

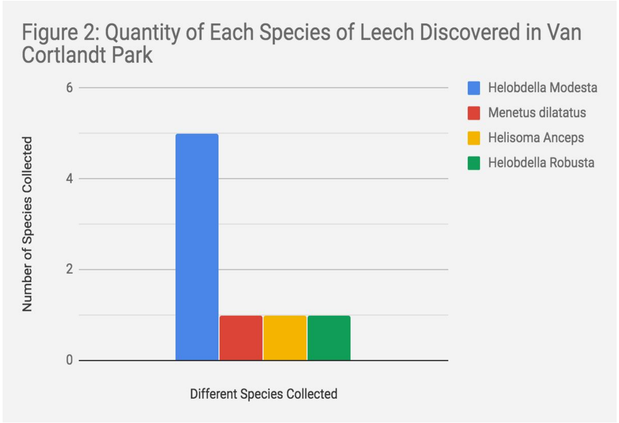


**Figure 2. Quantity of Each Species of Leech Discovered in Van Cortlandt Park** This figure shows the species that were determined from the DNA results of this experiment. Five leeches of the *Helobdella modesta* species were discovered, as well as one leech of the *Helobdella robusta* species. Also, one each of *Menetus dilatatus* and *Helisoma anceps* were discovered, which are both species of freshwater snails.

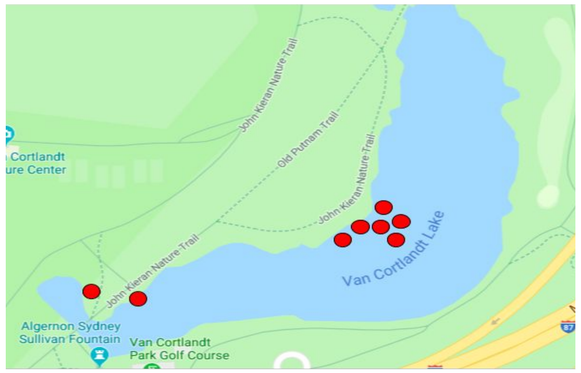


**Figure 1. Map of Locations in Van Cortlandt Park Where Samples Were Collected.** This figure shows the two locations where the identified leeches were found. Two leeches were found in location one, on the left, and six were found in location two. Another, location, Tibbetts Brook, is not include9d on this map because there were no successful species determinations from any leeches found there. This map was obtained using Google Maps.

| Site | Dissolved Oxygen (ppm) | pH Level | Nitrate (ppm) | Phosphate (ppm) | Coliform (yes/no) | Turbidity (JTV) | Water Temp (°C) |
|---|---|---|---|---|---|---|---|
| VCL South | 4 | 6 | 5 | 0 | YES | 0 | 14 |
| VCL North | 4 | 7 | 5 | 0 | YES | 0 | 14 |

**Table 2. Water Quality Data.** This table shows the water quality data from Van Cortlandt Lake on the day of collection. The measurements in ppm specified the number of molecules of a certain substance per million total molecules found in the water.

## Materials and Methods

- 30 samples of leeches were collected in Van Cortlandt Lake and Tibbett's Brook
  - Leeches were found in shallow, protected areas
  - Leeches were stored in 95% ethanol at -20°C
- Each leech was placed into a clean tube
  - DNA was extracted and amplified by PCR
  - The samples were stored long term at -20ºC
- The samples were then sequenced and analyzed using BLAST

## Discussion

- *Helobdella modesta* was found to be the most common species in Van Cortlandt Park in this experiment
- The only other species of leech found during this experiment was *Helobdella Robusta*
- However, since these samples were collected in a small area of Van Cortlandt Lake, it is impossible to say for sure whether this data is a true representation of the leech population, but it seems highly likely that *Helobdella modesta* is the most common leech species in VCP
- Two species of snails, *Helisoma Anceps* and *Menetus Dilatatus* were also identified during the experiment. These snails look very similar to the species of leeches being collected, so it is possible that they were mistaken for leeches
- Many of the DNA extractions were not able to be identified in the lab, and there are a few errors that could explain this
- Many of the samples (for example 24-30) were exceedingly small, so it was impossible to tell whether each step in the procedure to extract the DNA was properly completed
- In the future, this same experiment could be repeated, but with more samples, in order to ensure that the results of this experiment represent the true ecological makeup of leeches in Van Cortlandt Park.

## References

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## Acknowledgements

We would like to thank Alex Bryne, John Butler, Annie Kloimwieder, and Howie Waldman for help in collecting samples. We would like to thank Annie Kloimwieder again for teaching us how to successfully execute the experiments as well as for her advice on this summary report.