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# Van Cortlandt Leech Identification



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## Abstract

Leeches are a vital part of the ecosystem, serving as both predators and prey. However, it is hard to identify a species of leech based solely on its appearance. It is important to identify what species of leeches are living in a habitat to understand both how the leeches impact the ecosystem and how leeches are affected by their environment. Leech samples were collected in Van Cortlandt Park. Then, DNA was extracted and sent for sequencing. The resulting sequencing showed that the majority of the samples were of the species *Helobdella modesta*.

## Introduction

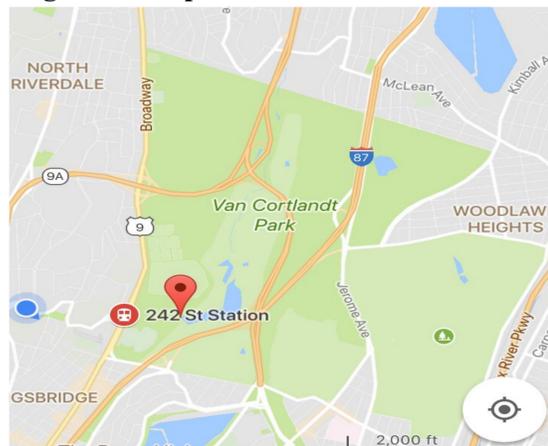
Leeches are a type of segmented worm found in a multitude of habitats including lakes and ponds.<sup>1</sup> Depending on their habitat, leeches can serve as either primary or secondary consumers and are an important source of food for many predators. This makes leeches an vital part of their ecosystem.<sup>4</sup>

The environment is radically changing through pollution, global warming, and habitat displacement. These factors often decrease biodiversity. Identifying species is a means of monitoring one of the environmental impacts of climate change.

The objective of this project was to identify the species of leeches contained in Van Cortlandt Park. The biodiversity of Van Cortlandt Park must be known in order to preserve and understand the ecosystem of the park. Since visual identification of leech species is difficult, species were identified by sequencing. Sequencing revealed the leech samples to be *Helobdella modesta* and *Eropbdella microstoma*.

## Results

**Figure 1: Map of Van Cortlandt Park.**



**Figure 1.** All samples were collected from Van Cortlandt Lake, shown by the red locator icon.<sup>5</sup>

**Table 2: Species of Leech Identified.**

Leech Number	Leech Species
KRG-001	unknown
KRG-004	<i>Helobdella modesta</i>
KRG-005	<i>Helobdella modesta</i>
KRG-006	<i>Helobdella modesta</i>
KRG-007	<i>Helobdella modesta</i>
KRG-008	<i>Helobdella modesta</i>
KRG-009	<i>Helobdella modesta</i>
KEG-010	<i>Eropbdella microstoma</i>

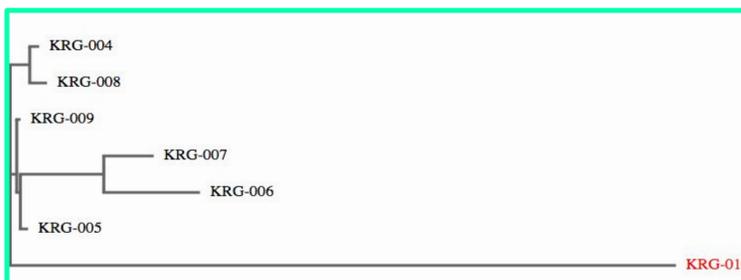
**Table 2.** Leech species of each sample as identified by sequencing.

**Table 1: Water Quality Measurements in Van Cortlandt Lake.**

pH	Temperature °C	Dissolved O <sub>2</sub>	Nitrates (ppm)	Phosphate (ppm)	Coliform
6.83 (good)	18	35% (poor)	5 (fair)	1.08 (excellent)	positive

**Table 1.** Measurements of water quality at the site in Van Cortlandt Lake where leeches were found. There were three repetitions for each test, the data shown is the mean.

**Figure 3: Maximum Likelihood Phylogenetic Tree.**



**Figure 3.** Maximum likelihood phylogenetic tree of leech species recovered from Van Cortlandt Lake. Labels on each branch show the sample number.



**Images from sample collection in Van Cortlandt Park.**

- 30 leech samples were collected from logs and rocks, ten from each of three different locations in Van Cortlandt Park.
- At each site water quality testing was conducted using a LaMotte Estuary and Marine Monitoring Kit.
- The DNA in the samples was isolated, amplified through PCR, and assessed using gel electrophoresis. The eight samples with successful PCR results were then sent to Genewiz for sequencing.

## Discussion

Different species of leeches were identified in Van Cortlandt Lake in Van Cortlandt Park. This is the first test of the species of leeches within the park. 8 of the 30 samples collected were successfully amplified by PCR and 7 were successfully sequenced. All samples were found on the same rock (Figure 1). Although the majority of leeches, 6, were of the same species and genus, *Helobdella modesta*, one sample belonged to a different genus of leech, *Eropbdella microstoma* (Table 1).

The primary error in this lab was the failure to successfully extract DNA from the samples. It is likely the leeches were not sufficiently broken down while using the mortar and pestle, minimizing the amount of DNA that could have been extracted.

Although we successfully identified different species of leeches from Van Cortlandt Park, it would be interesting to get a more comprehensive understanding of the different species of leeches in Van Cortlandt Park. In the future, it would be interesting to collect leeches and measure water quality from a wider variety of locations throughout the park in order to reach a greater understanding of how the quality of the water impacts the leech population Van Cortlandt Park.

## References

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