

A comparison of leech biodiversity on steep and gradual sloped banks of a pond

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Abstract

- The West and North banks with the South and East banks have the most gentle slope
- It is believed that the biodiversity of leeches changes depending on the slope of banks.
- There was active collection on our high school campus pond and passive using traps, then the leeches were barcoded.
- From this collection, there were 5 different species collected, from 3 different pond banks.
- It was concluded that the banks with a softer slope had a greater biodiversity.

Introduction

- Believe that there would be a higher amount of species variation on a bank with a gentle slope.
- Are found in freshwater ponds and rivers
- They hide in the soil/sediments and hibernate in the soil during the winter
- Leeches feed on meat
- Leeches are also used for medical purposes
- The surroundings in the pond were covered with leaves with soft soil
- Tend to be a blackish brown color .

Methods and Materials

- Collection of leeches occurred through the use of both traps and active sampling of the leeches
- Leeches were trapped and collected from the high school campus pond.
- The traps were made with a folded pie crust tin, with holes cut in it, and it was sealed with paper clips.
- Once collected the leeches were placed into a freezer.
- In addition to traps, active collection took place, Sediment was scooped up, then emptied into a tray, and sifted through for specimen.
- When a leech was found, it was recorded, and then put in a petri dish with an assigned number.
- After this, Leeches were identified using field guides and online sources.
- Once the leeches were identified, the DNA extraction process started.
- DNA was extracted using keelex and a grinding motion.
- This solution was then amplified using the PCR process.
- Finally it was run on a gel during gel electrophoresis to see if PCR was successful.

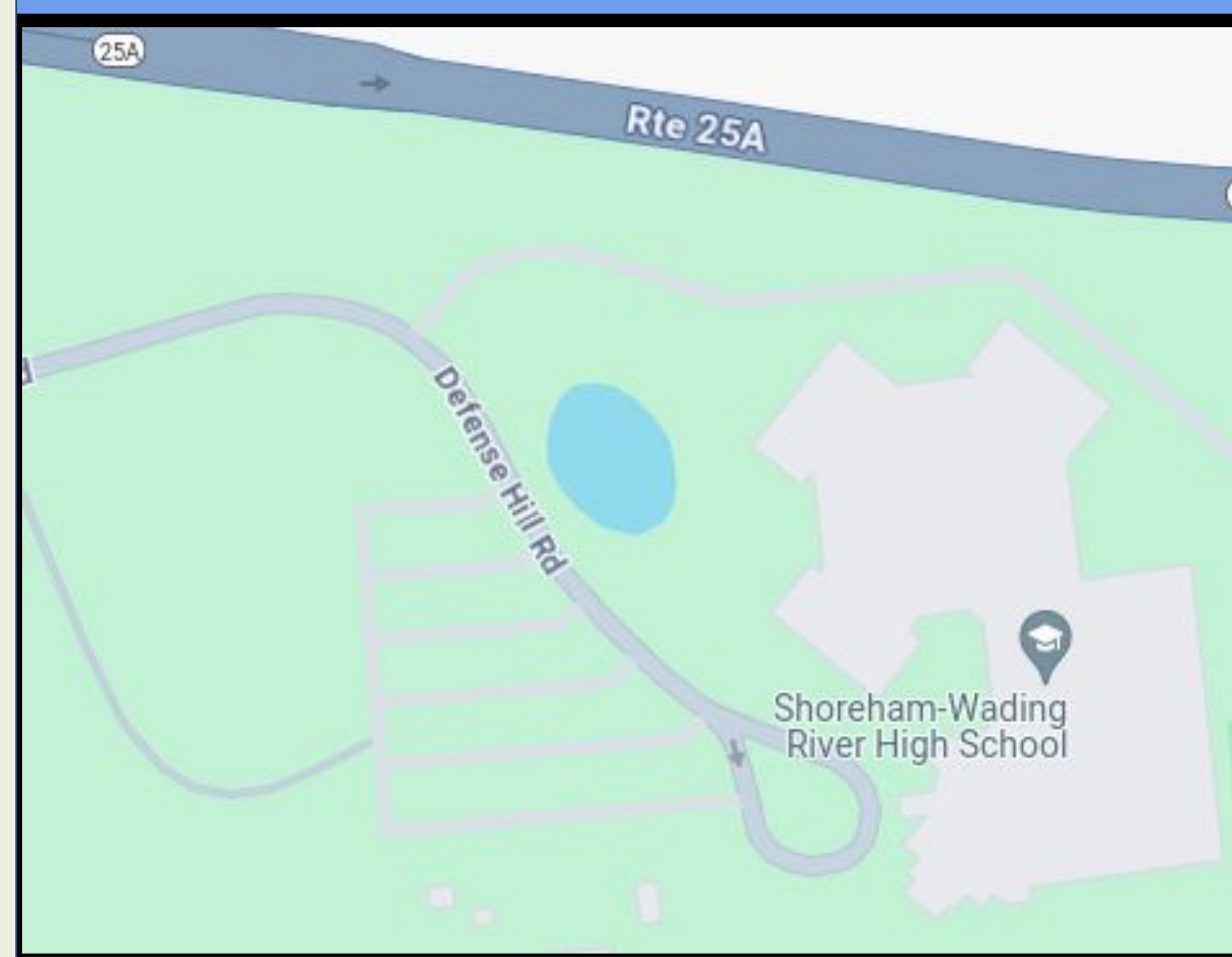


Figure 1: High School Pond (Source: Google Maps)

Results

Leech #	Scientific Name	Common Name	Location	Genetic ID
Leech 1	Macrobdella Decora	North American Medicinal Leech	East Bank	
Leech 2	Ilionobdella elongata	N/A	North Bank	Erobddella/ Arhynchobdellida.
Leech 3	Macrobdella decora	North American medicinal leech	South Bank	
Leech 4	Macrobdella decora	North American medicinal leech	East Bank	
Leech 5	Macrobdella decora	North American medicinal leech	South Bank	
Leech 6	Macrobdella decora	North American medicinal leech	North Bank	
Leech 7	Macrobdella decora	North American medicinal leech	South bank	
Leech 8	Macrobdella decora	North American medicinal leech	South bank	
Leech 9	Macrobdella ditetra	North American medicinal leech	South bank	
Leech 10	Macrobdella ditetra	North American medicinal leech		
Leech 11	Ilionobdella elongata	N/A		
Leech 12	Ilionobdella elongata	N/A		Arhynchobdellida sp. SERC INVERT 1430 voucher
Leech 13	Macrobdella ditetra	North American medicinal leech		
Leech 14	Philobdella Floridaana	N/A	South bank	
Leech 15	Philobdella Graolis	N/A	South bank	
Leech 16	N/A	N/A		
Leech 17	Macrobdella decora	North American medicinal leech	South bank	

Figure 10 this is are genetic and taxonomic identifications with the banks each leech was found.

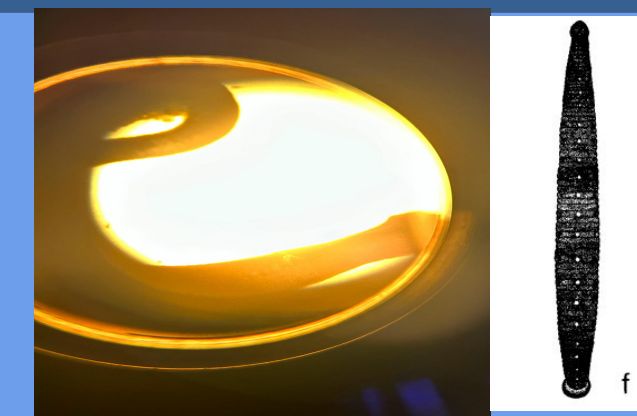


Figure 2: Specimen #1 identified as a North American Medicinal Leech
Specimen Under Microscope(L) Timothy Nigrel(R) Biota of freshwater ecosystems Identification manual #8 (Photo credit)



Figure 3: Specimen #2 identified as an Ilionobdella elongata
Specimen In Petri Dish on top of Ruler(L) Nathan Schaefer(R) Biota of freshwater ecosystems Identification manual #8 (Photo credit)



Figure 4: Specimen #3 identified as an North American Medicinal Leech
Specimen Under Microscope(L) Timothy Murphy R) Biota of freshwater ecosystems Identification manual #8 (Photo credit)



Figure 5: Specimen #4 identified as an North American Medicinal Leech
Specimen Inside petri dish(L) Nathan Schaefer(R) Biota of freshwater ecosystems Identification manual #8 (Photo credit)



Figure 6: Specimen #5 identified as an North American Medicinal Leech
Specimen Inside petri dish) Timothy Murphy(R) Biota of freshwater ecosystems Identification manual #8 (Photo credit)

Gel Electrophoresis



Figure 8 was the first gel electrophoresis which didn't work.

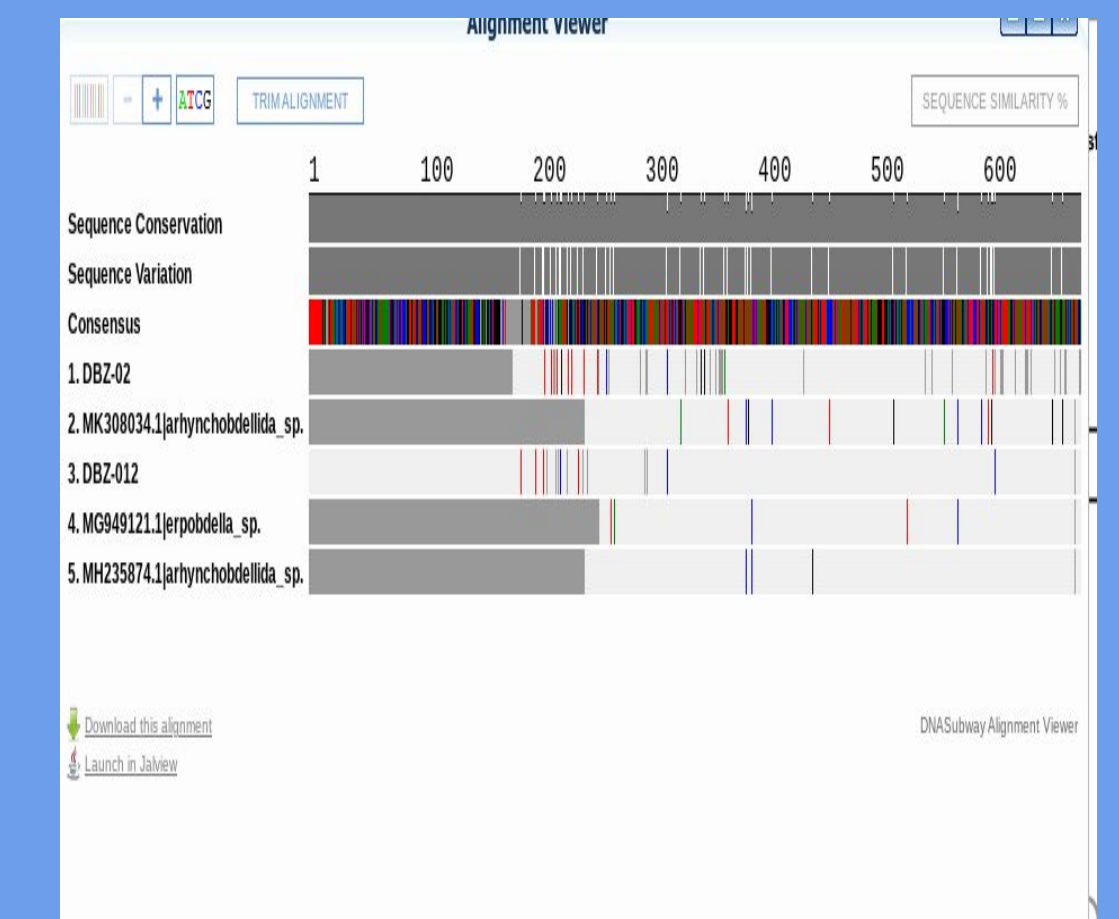


Figure 9 is alignment viewer which shows the connection between bot sequences.

Meta Data table

What we collected	What's healthy for leeches
pH 7	pH 7
Phosphate 1	Phosphate Mg/l 0.03
Nitrate less than 5	Nitrate <30 mg/l

Figure 7 a table that was tested in the water quality to see what's healthy.

Discussion

- The south bank contained the most variety in species having 5 different species.
- With east and North banks contained the least variety of species having 1 with
- Also with south having a more gentle slope compared to the east, north and the south banks.
- The results of the two genetic identifications show that the original taxonomic identification was incorrect for those samples. However, this doesn't mean that much in the big picture of this project. Even though the two samples were originally identified incorrectly, it doesn't affect the biodiversity on the banks. That being said, just by judging off of the original collection one could still infer the result would be that there is more biodiversity on the three gentle sloped banks. While this project may have not worked as expected, between the PCR process not working the first and second time, or DNA subway not being able to work because of the poor sequences from the leeches, it is an important project. The results of this experiment will tell people the ideal location in a body of freshwater or where to locate leeches for any purpose they need, and it could be a huge help. In the process of the future, if somebody were to pick up this project where it left off, they would probably complete the PCR process, and when they get all the results back complete DNA subway, then truly showing the biodiversity of the banks.

Conclusions

- It is assumed that the hypothesis is correct.
- The expected species of the leeches show how the West bank contain the least variety of species compared to the other the banks.
- This would therefore prove the hypothesis correct.
- After that the the hypothesis could be answered with proof.

References

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