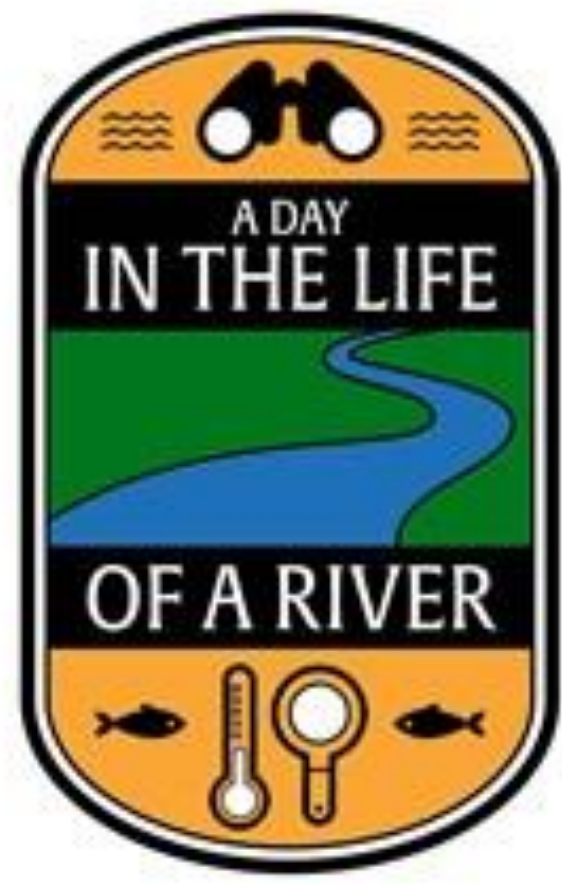




Exploring and Barcoding the Invertebrate Organisms of the Peconic River Estuary

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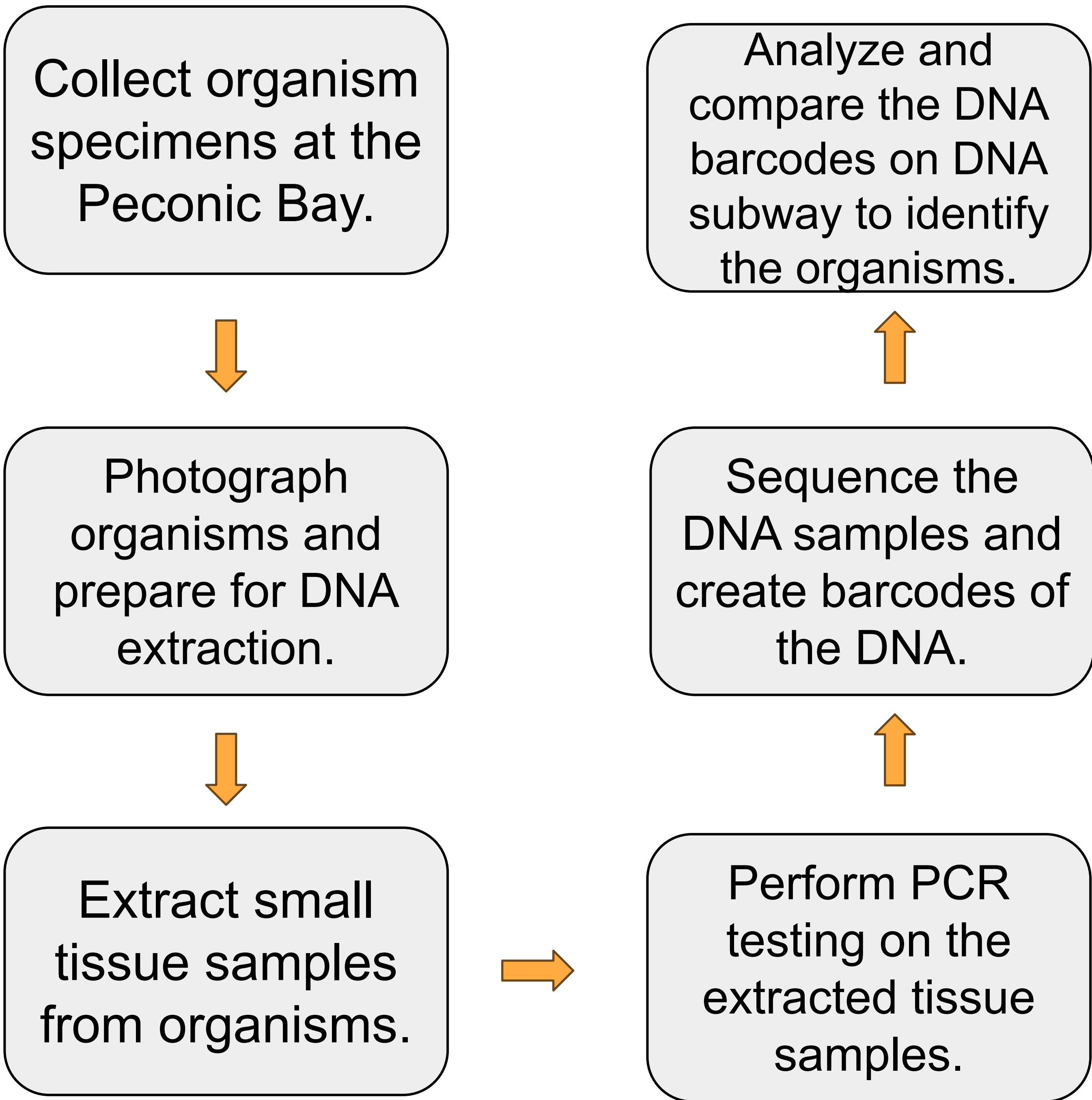
Abstract

In our project, we identified macroinvertebrate organisms of the Peconic Bay estuary. To correctly identify our organisms, we extracted tissue samples from our specimens, and performed PCR tests on it. This enabled us to amplify the DNA in the tissue, and prepare it to be sequenced and barcoded. We then barcoded the DNA results and identified our organisms. We found that dragonfly nymphs and leeches inhabit the Peconic, which indicate different things about the water quality. Dragonfly nymphs indicate positive water quality, but leeches indicate water pollution, so although the Peconic may be clean, it’s also facing nitrogen pollution.

Introduction

DNA barcoding is a process used to identify organisms and analyze the biodiversity of ecosystems. These barcodes are made by amplifying and sequencing the DNA of organisms. Once the barcodes are created, they can be compared to other barcodes to identify organisms. In our project, we utilize the CO1 gene to barcode our organisms. This is a gene found in nearly all mitochondria of eukaryotes, and using it will help get an understanding on how healthy the estuary ecosystem is. There are current issues in the Peconic including nitrogen contamination and invasive species. It’s important to check on the health of the ecosystem, and monitor biodiversity as an indicator of stability.

Materials and Methods



References



Acknowledgements

Thank you to the DNA Learning Center Staff, especially Katrina Giambertone for support with proposals, providing laboratory equipment, and supporting sequence analysis. Special thanks to our mentors Mr. Robert Bolen and Mrs. Jenelle Schmiri for all of their help throughout the project development

Results

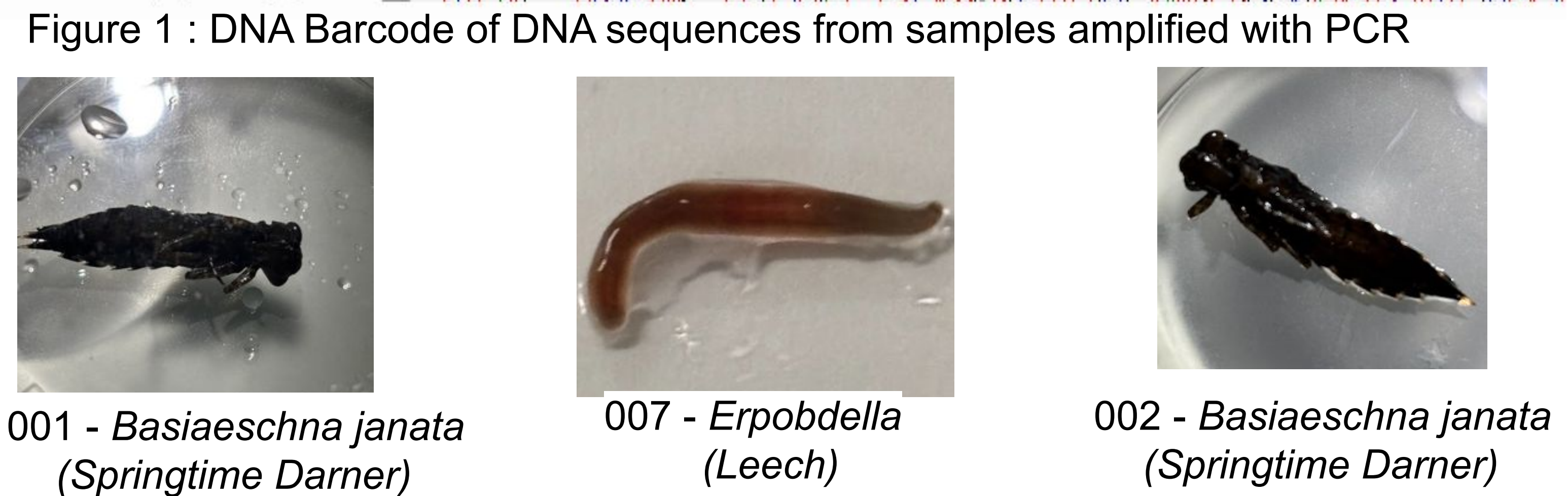
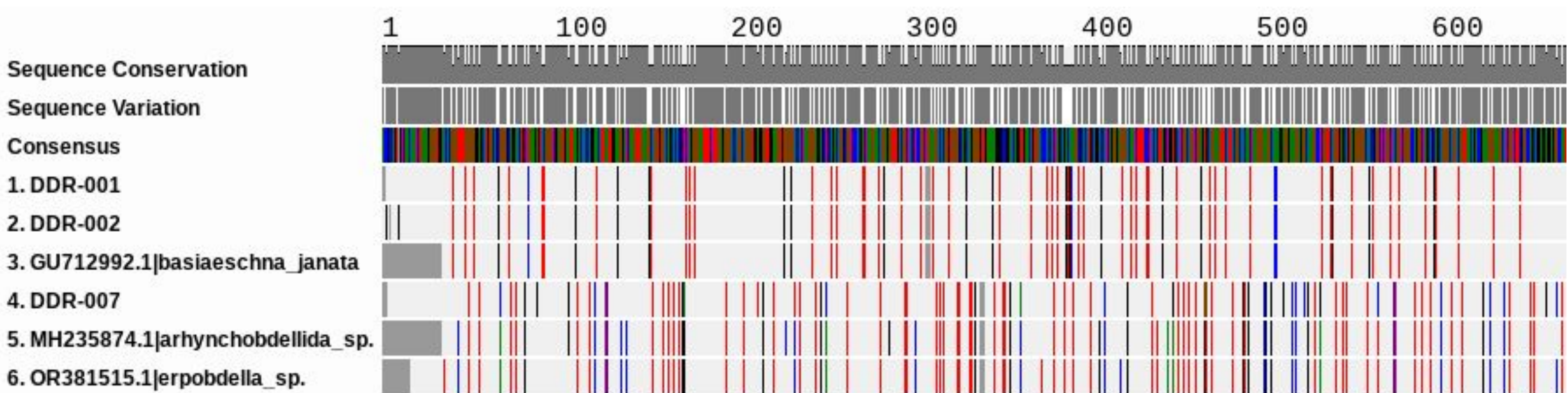


Figure 2 : Sequence similarity grid illustrating the samples collected that match the BLAST results

	C	1	2	3	4	5	6
C	-	90.04	89.66	89.06	86.15	84.50	85.33
1	90.04	-	99.59	100.00	75.98	73.44	74.96
2	89.66	99.59	-	100.00	75.70	73.44	74.96
3	89.06	100.00	100.00	-	73.89	73.44	73.28
4	86.15	75.98	75.70	73.89	-	96.35	96.44
5	84.50	73.44	73.44	73.44	96.35	-	98.94
6	85.33	74.96	74.96	73.28	96.44	98.94	-

Figure 3 : Table of samples, species identification, BIT scores, and number of mismatches

Sample Number	Species Identification	BIT Score	Mismatches
001	<i>Basiaeschna janata</i>	1191	0
002	<i>Basiaeschna janata</i>	1191	0
007	<i>Erpbodella</i>	1154	25

Discussion

- Samples 001 and 002 were found to both be dragonfly nymphs, scientifically known as the species *Basiaeschna janata*. This species is native to central and eastern United States, and are very important to ecosystems. These dragonflies are carnivorous insects, and are also indicators of good water quality. They are small and blue-colored, and begin their lives in aquatic environments as dragonfly nymphs until they grow wings, which is when they exit the water for the rest of their lives.
- Sample 007 was found to be a leech of the *Erpbodella* genus. This is a small brown-striped genus of leech, that is native to North America. These organisms live in ponds and other aquatic environments, and they feed on small invertebrate freshwater organisms. These leeches are important, because they can indicate water pollution.
- Our results have shown that the estuary contains biodiversity, but may also be currently facing water pollution. This is significant because nitrogen contamination has been an issue to the public in past years, and it must be addressed.

Future Directions

- Barcoding organisms from other Long Island ecosystems
- Comparing our barcode results to other results from past years

