Analysis of DNA Barcoded Macroinvertebrates in the Peconic River

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Abstract

The project incorporated barcoding organisms like Dragonfly larvae and tracking the different types of species. Measuring the biodiversity “of the river ecosystem” reveals “additional information about” the quality of the river. An issue in the Peconic area is species endangerment. As there is more biodiversity, the quality of the river is better. DNA Barcoding is a process that is used to look at the DNA of different organisms to determine the species. The specific gene that will be extracted and sequenced is the mitochondrial cytochrome c oxidase subunit I, or the (COI) gene.

Introduction

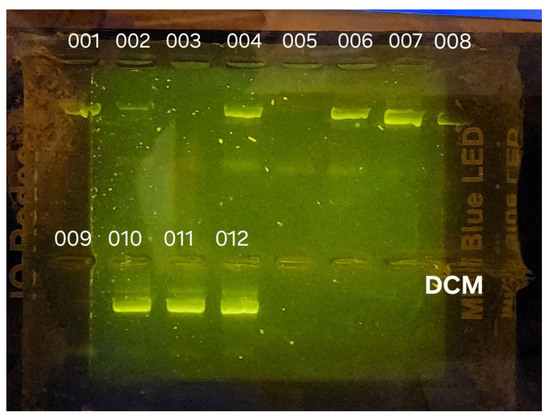
The reason behind barcoding the organisms is to identify the types of species within the Peconic estuary while also determining the biodiversity of habitat. DNA barcoding is used to identify a species using short and standardized segments of DNA called cytochrome c oxidase subunit I, or the (COI) gene. DNA barcoding checks for uncovered diversity and monitors ecosystems.

Studying the Peconic River is important because many species are affected and possibly endangered from certain factors near the river. For example, nitrogen runoff from fertilizers increases the amount of algal blooms. Algae prevents other plants from getting sunlight for photosynthesis, which can affect many other organisms who eat the plants. Another major issue is pollution. Pollution can decrease biodiversity and kill animals and plants. Checking for biodiversity will reveal the quality of the river.

Materials and Methods

Samples were collected in the Peconic Estuary by using a seine net to capture and record the macroinvertebrate species and kept frozen.

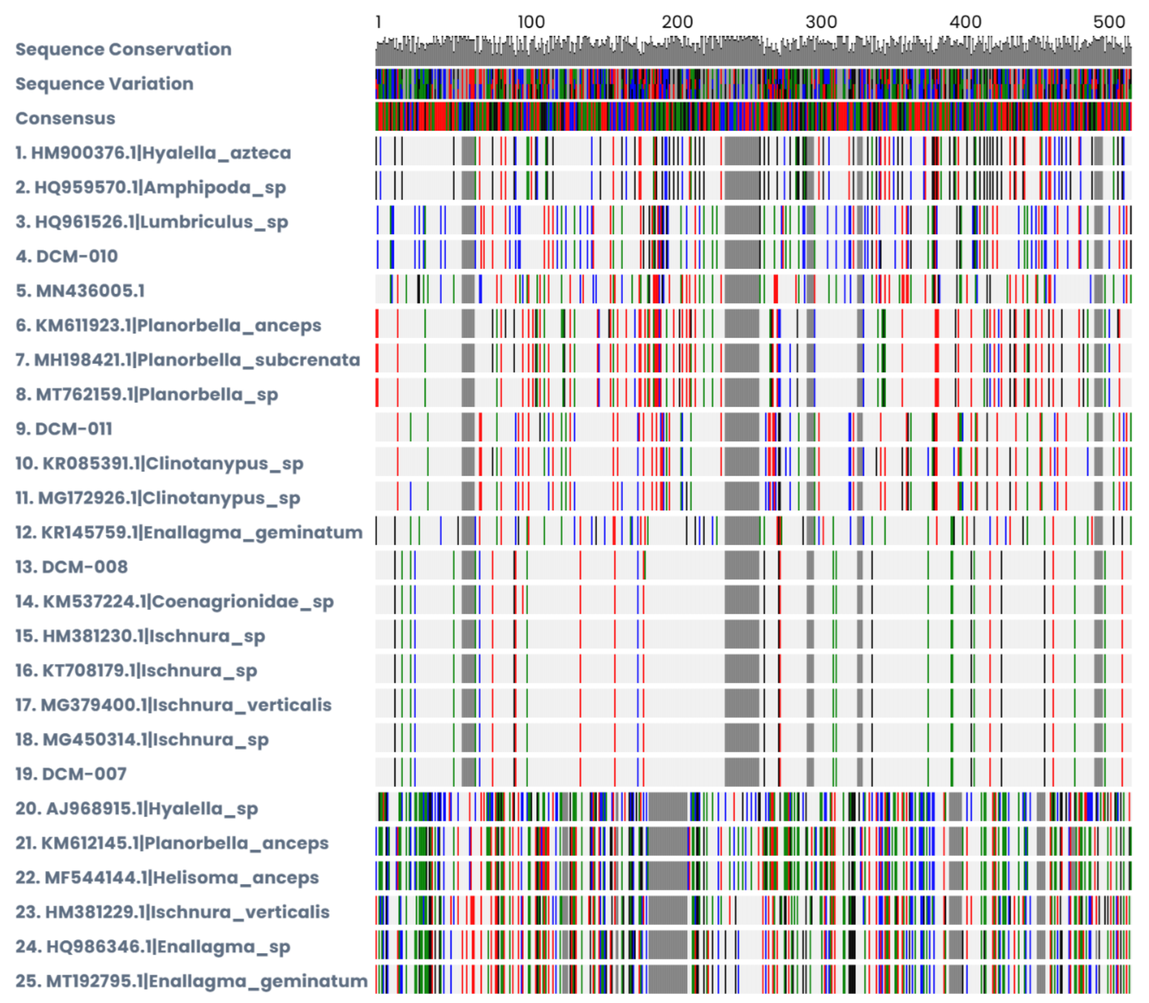
The DNA was isolated in each organism, and gels and PCR was ran to determine what type of organism.



DNA Subway was used to trim, edit, and pair the sequences of the organisms to identify the species.

References

Results



Sample ID	Scientific Name(s)	Common Name(s)
DCM-005	Erpobdellidae_sp	Leech family
DCM-007	*Ischurna verticalis*	Eastern Forktail (damselfly)
DCM-008	*Ischurna verticalis*	Eastern Forktail (damselfly)
DCM-009	Erpobdellidae_sp	Leech family
DCM-010	Lumbriculus	Blackworm family
DCM-011	Clinotanypus	Genus of aquatic flies

Discussion

DNA was extracted from all 12 samples. PCR was ran and 9 samples were successfully amplified. On DNA Subway, the DNA was processed by trimming sequences and blasing information to get the species name. Four samples were identified. Sample DCM-007 was Ischurna Verticalis. DCM-008 was also a Ischurna Vertivalis. Sample DCM-010 was a Lumbriculus. DCM-011 was a Clinotanypus.

These findings show that there is a great amount of biodiversity. This is important because biodiversity of the peconic estuary ecosystem needs to be diverse in order to function correctly.

The main takeaway the public should have is that the ecosystem is balanced and healthy. The conclusions found were expected because many of the species were similar as to what was predicted and showed biodiversity in the Peconic Estuary.

Future Directions

This project could be continued by collecting more samples from the estuary and averaging the percentage of each organisms in the estuary in order to see the full extent of biodiversity. Sequences could also be reran to check the accuracy of the results.

Acknowledgements

Thank you to the DNA Learning Center Staff for support with proposals, providing laboratory equipment, and supporting sequence analysis. Special thanks to Jeff Petracca for technical support with sequencing.