Barcoding Aquatic Invertebrates of the Peconic River

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Abstract

20 specimens were collected from the Peconic River using small nets and waders. DNA was extracted, amplified with PCR, and barcoded using the CO1 gene. Subsequently, sequences were analyzed and refined with DNA Subway and found matches for species DNA. Some species identified include leeches and pill clams, a backswimmer, a springtime darner and a brown marmorated stink bug. The leech *Helobdella fusca* is a non-native species identified in this study.

Introduction

The Peconic Estuary is located between the North and South Forks of Long Island. It is considered endangered due to nitrogen pollution, overuse, and overdevelopment. This estuary is important because it is a habitat for many different species. The most common gene used in DNA barcoding is the CO1 gene. This gene is used because it is found in most eukaryotic organisms. DNA Barcoding is 99.2% accurate. Some major problems in the Peconic Estuary are nutrient pollution, brown tide, toxic chemicals, habitat loss, and pathogen contamination. Some causes of these major problems are humans polluting water with pesticides, invasive species, and construction.

Materials and Methods

Collecting samples from the Peconic River Estuary using nets

Photographing the samples, preserving the samples in ethanol, and extracting the DNA from the samples

Barcoding the samples using the CO1 gene and putting them through DNA Subway to identify the species

Future Directions

We will continue to take samples from the Peconic River to barcode every year. Using the CO1 gene we will be able to identify the specimens and the types of specimens that appear will clue us in to how healthy the river is.

Results

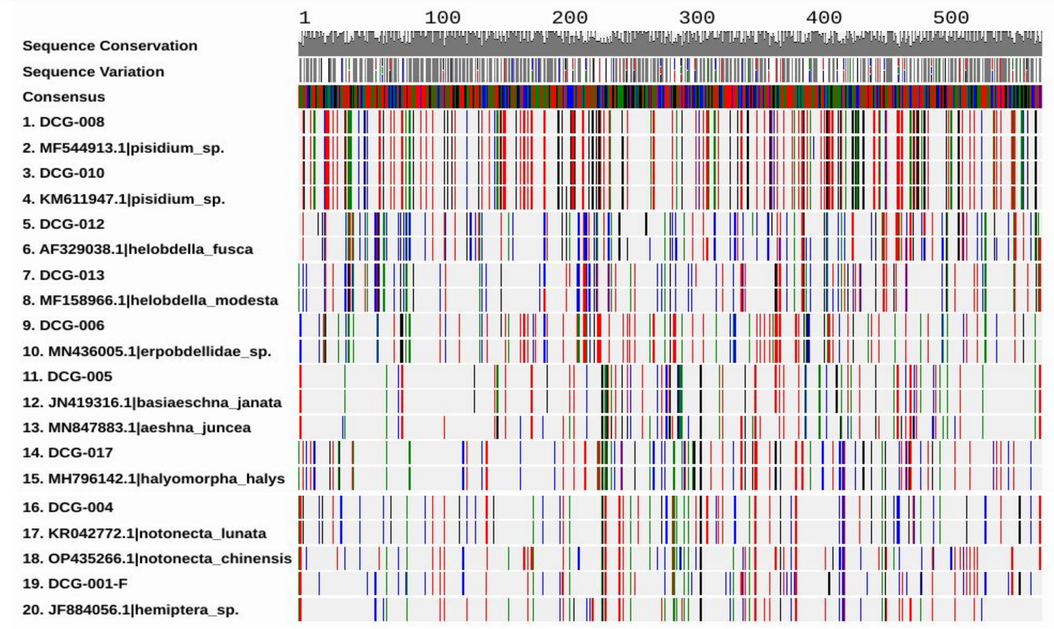
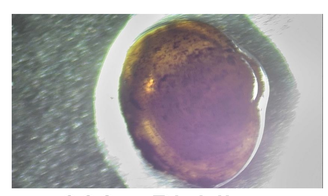


Figure 1 : DNA Barcode of DNA sequences from samples amplified with PCR

005 - Basiaeschna janata



008 - *Pisidium*

013 - Helobdella modesta

Figure 2 : Images of samples, followed by their respected numbers and scientific names

Sample Number	Scientific Name	Common Name	Bit score / Mismatches
DCG-004	*Notonecta lunata*	Backswimmer	1184 / 0
DCG-005	*Basiaeschna janata*	Springtime darner	1169 / 0
DCG-006	Erpobdellidae	Leech	1128 / 2
DCG-008	Pisidium	Pill clam	1160 / 2
DCG-010	Pisidium	Pill clam	1168 / 1
DCG-012	*Helobdella fusca**	Leech	1064 / 17
DCG-013	*Helobdella modesta*	Leech	1160 / 4
DCG-017	*Halyomorpha halys*	Brown marmorated stink bug	1171 / 0

Figure 3 : Table of samples, species identification, BIT scores, and number of mismatches. * indicates a novel specimen to the estuary that has not been recorded

Discussion

We were not able to identify the genus and species for all of the samples we collected. However, our findings indicate the improved biodiversity of the Peconic Estuary. The increased variety of native species identified as opposed to years prior support our hypothesis that the Peconic has been improving. The extent of the diversity of the specimens collected was far beyond expectations of the health of the river. We were pleasantly surprised with the Peconic Estuary recovery due to the countless efforts of many conservation groups. A leech species new to the estuary was identified as *Helobdella fusca,* and has not been observed in prior years.

References

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