New York Harbor Plankton

NY 2014 Harbor School
Marine Biology Research Program

By Samuel W, Stefanos K

Plankton Monograph Research Plan

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Topic: Plankton Sampling to produce a monograph displaying species diversity.

Scientific Problem: What types of plankton live in the New York Harbor and is there a correlation between species diversity and seasonal and temperate changes.

Hypothesis: The NYC estuary has two main water systems flowing into it; the Hudson River, and the Atlantic Ocean. During different times of the year, different currents come through the harbor, bringing with them, and different species of zooplankton. We believe that there will be an increase in zooplankton levels during warmer months, and less during colder months

Objectives:

1. Identify and record different types of plankton found through sampling the New York Harbor throughout he use of a dichotomous key.

2. Create monograph of plankton found in the New York Harbor using data from samples taken.

Our research produces important information on bio-indicators, mainly plankton in the New York Harbor. This research is new to the New York Harbor and has only recently been done by two other organizations, the “Bio-Bus” working with Columbia University and “The River Project”. Our goal for this project is to see a correlation between species variation of plankton with seasonal change. A beneficial outcome of this project on society is that we can help people understand the effects plankton has on the environment and how

to help it. Water conditions are affected by the people living around it so plankton is most likely affected as well.

We believe that there is in fact a correlation between seasonal change and plankton diversity. We believe that warmer weather brings an influx of species diversity to the New York Harbor and with colder weather comes a decrease in species diversity. Although we believe this to be true we still question whether there are any other water quality factors that affect the plankton in the New York Harbor.

Procedures - Plankton Sampling, Microscopy, Dichotomous Key, Water Quality data analysis, Climate observations. These procedures, attached to the back show the detailed steps to not only plankton sampling but also to analyzing the data that is collected.

Participants – Stefanos Kalogrias & Samuel Wilson

Organisms – Plankton, from New York Harbor, no discomfort due to use of alcohol.

Major References – Major References –

. Johnson W. S & Allen D.M (2012) "Zooplankton of the Atlantic and Gulf Coast" Baltimore, Maryland. John Hopskins University.

Sagarin R.D (1999) "Climate related change in an intertidal communality"

Robert W.G (2001)"Zooplankton & their characters" – Limnology

Craig M. Young (2002) "Atlas of Marine Invertebrate Larvae"

"Marine Animals of Southern New England and New York" - Howard M. Weiss, Ph.D

Dichotomous Keys both offline and online

Steps and Procedures

Operating a Stereoscope

1-adjust all three lenses to be in focus within work surface

2-place sample on slide

3-place slide under field of view of stereoscope

4-examine sample

Preparing wet slide mount and compound microscope

1-after microscope is ready, tilt so slide is comfortably visible

2-clean slide with accuwipe

3-place sample on slide

4-apply slide cover at an angle to reduce bubbles

5-place slide under stage clip

6-focus on sample on slide

7-record numerical data on data table

8-examine sample

Maintaining microscope

1-carry microscope by arm and base, place on flat surface, away from edge of desk

2-make sure the microscope is in proper settings, lowest power, stage lowered

3-all glass and lenses must be cleaned, with paper and isopropyl alcohol

Sampling both zoo and phyto - plankton in salt water bodies

1-scout viable area, depth, water quality and light penetration

2-take sample or preserve it

3-observe sample under microscope back in lab

4-sketch and identify species

5-then preserve sample for late

Operating a bogorov chamber

1-clean bogorov chamber with accuwipe

2-fill pipette with sample water

3-empty sample water into chambers of bogorov slide

4-observe samples under stereoscope

Utilizing a dichotomous key to identify species

1-decide what organism looks most like your species based on dichotomous key index

2-continue going through classifications until you have narrowed down you species

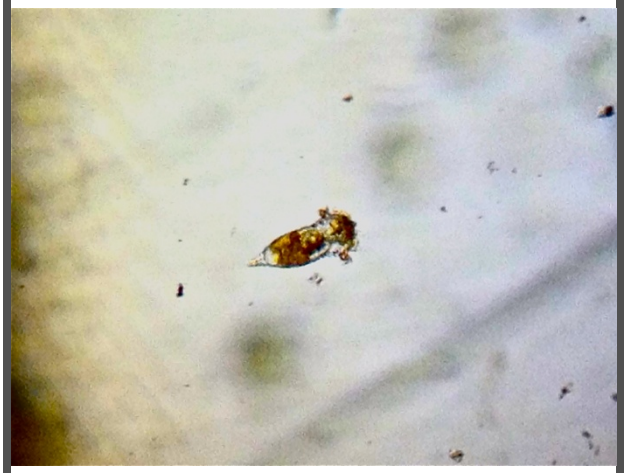
3-chose from the available species based on key factors of your sample

Items	Quantity	Function
343 ml Plankton Net	1	Plankton Sampling
Squirt Bottle	1	To release plankton from net
Water Quality Data	N/A	To compare and analyze data
Preserving Alcohol	2 - 4 Bottles	Preservation
Plankton Slide (bogorov chamber)	2	Observe live samples
Microscope Slides + Cover Slips	N/A	Observe microorganisms within samples
Petri Dish	4	Hold larger samples
Sample Bottle	1	Hold preserved samples
Compound + Stereoscopic Microscopes	2 of Each	Observe plankton
AccuWipes + Kim Wipes	N/A	Clean equipment
Pipets	2	Extract organisms from sample
Dissecting Tweezers	1	Aid in dissection
Teasing Rod	2	Safely move sample
Gloves	N/A	Protection

Data & Analysis: We started testing in November of 2013 off of Pier 101 on the east side of Governors Island in buttermilk channel.
We noticed a very scarce amount of plankton, and very little diversity.
But as the temperatures rose due to seasonal changes we observed a direct correlation between increasing temperatures of the water, and biodiversity/density of zooplankton in our samples. After about one and a half years of sampling the monograph attached shows the different species found during our sampling. They also show the date and time of day since plankton come out at different times of the day and for our project the date was extremely important since we were comparing the species diversity and season of the year.

Conclusion: Our hypothesis was not supported due to lack data to make an official conclusion. Based on our observations, the amount of zooplankton and variety of zooplankton increased significantly with warm weather. Reasons for increased biodiversity/density are unknown but may be due to warm weather currents coming in from the south, and bringing with it, large amounts of different zooplankton.
-Improvements: correlating plankton data with water quality data. Tally plankton numbers
-Limitation: Was not able to sample freely to get different samples from different times. Unfortunately was not able to gather enough water quality data to be able to correlate plankton sample with water quality.
Could was not able to sample in the middle of the summer.

Image #1



Systematics-

Common Name - Rotifer

Habitat - NY Harbor

Other Info -

Time Stamp-3:03 pm 1/9/14

Systematics-
Common Name -

Habitat - NY Harbor

Other Info - Plankton Larvae

Time Stamp-3:24 pm, 1/9/14

Image #2

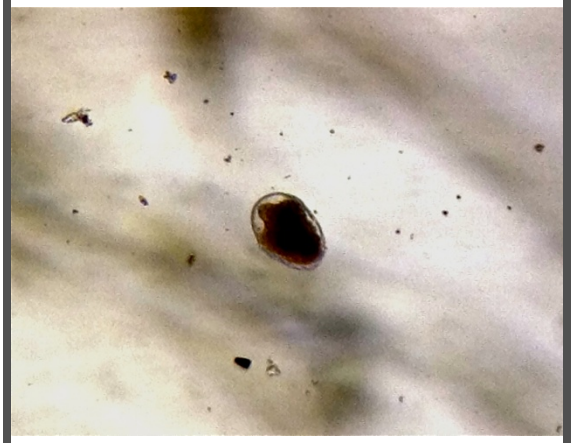
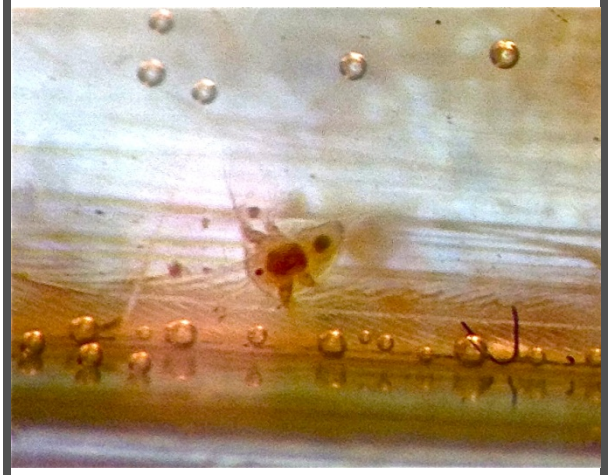


Image #3



Systematics- Cirriped

Common Name - Barnacle

Habitat - NY Harbor

Other Info - Nauplius stage
Stereoscopic view

Time Stamp-2:51 pm, 1/23/14

Systematics- Cirriped

Common Name - Barnacle

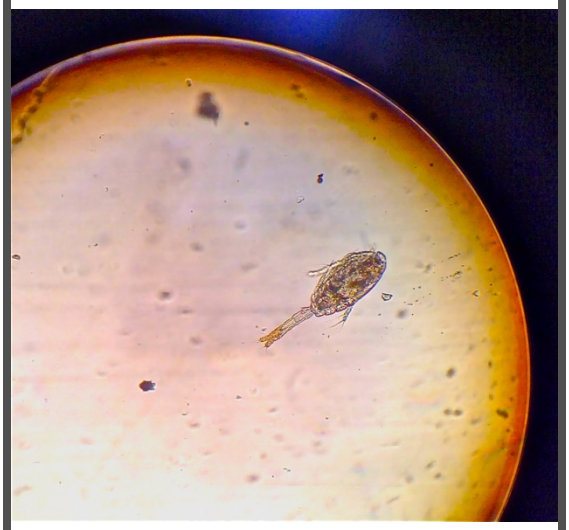
Habitat - NY Harbor

Other Info - Larvae of Nauplius Barnacle under compound microscope evident due to side horns in image.

Time Stamp-3:02 pm, 1/23/14

Image #4

Image #5



Systematics-

Common Name -
Habitat -

Other Info -

Time Stamp-3:21 pm, 1/23/14

Systematics-

Common Name - Copepod #3

Habitat -

Other Info -

Time Stamp-3:26 pm, 12/12/13

Image #6

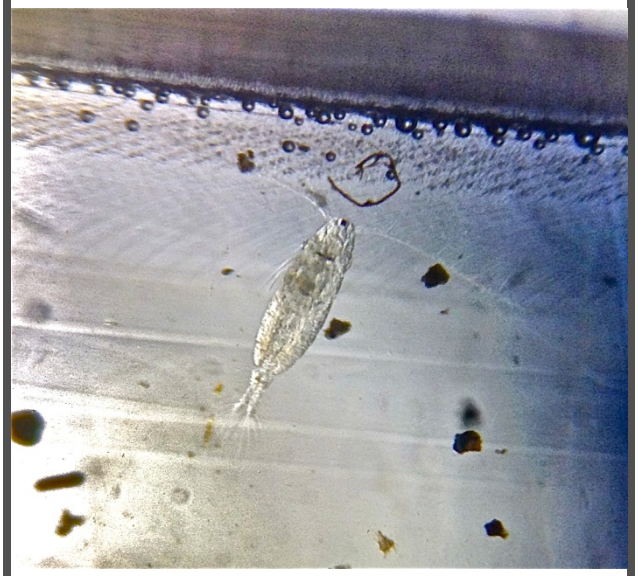


Image #7

Systematics-

Common Name -

Habitat - NY Harbor

Other Info - Most Likely two separate species mating.

Time Stamp-3:02 pm, 4/1/14

Systematics- Unciola irrotata

Common Name - Amphipoda

Habitat - NY Harbor

Other Info - Order:Dimphipoda

Time Stamp-2:16 pm, 4/29/14

Image #8

Image #9

Systematics- Hydrozoan

Common Name -proboscidactyla ornata

Habitat - NY Harbor

Other Info -

Time Stamp-2:02 pm, 4/10/14

Systematics- Ostracod

Common Name -evadne nordmanni

Habitat - NY Harbor

Other Info - "Zooplankton of Atlantic Coast" - Pg 144

Time Stamp-254 pm, 4/29/14

Image #10

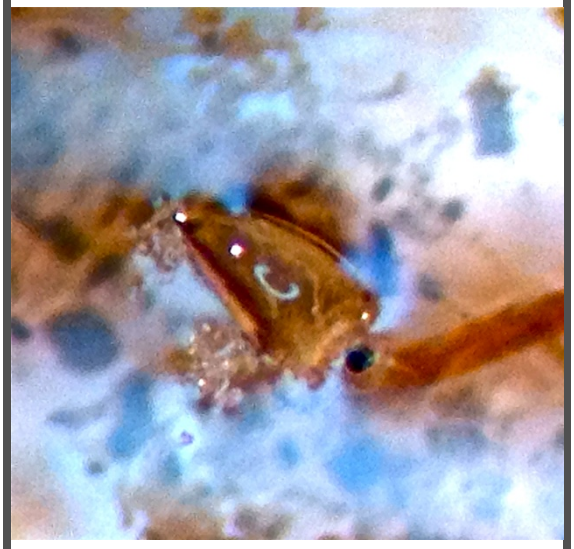


Image #11

Systematics-

Common Name - Diatom

Habitat - NY Harbor

Other Info -

Time Stamp-2:59 pm, 4/3/14

Systematics-

Common Name -

Habitat - NY Harbor

Other Info -

Time Stamp-2:38 pm, 4/3/14

Image #12

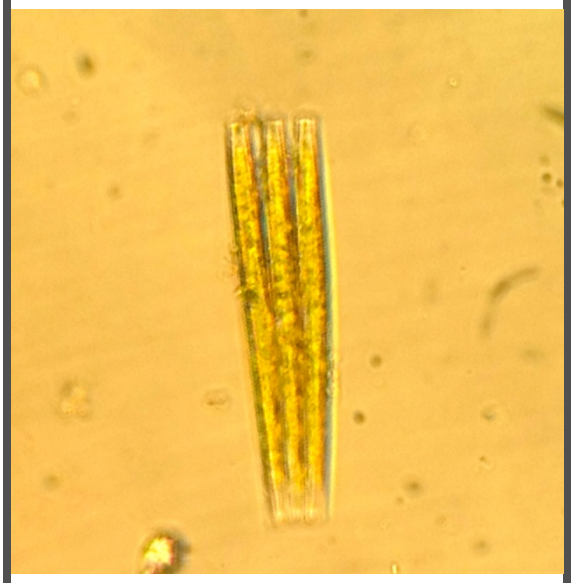


Image #13

Systematics-

Common Name -

Habitat - NY Harbor

Other Info -

Time Stamp- 2:12 pm, 5/22/14

Systematics-

Common Name -

Habitat - NY Harbor

Other Info - Possible zooplankton carrying egg sack.

Time Stamp-2:25 pm, 5/22/14

Image #14

Image #15 Magnification:_____

Systematics- Midge Larvae

Common Name -Chironomiidae

Habitat - NY Harbor

Other Info - Sample taken off of invertebrate growth on porcelain tiles.

Time Stamp-2:13 pm,9/17/14

Systematics-Malacostraca

Common Name -Caprellid amphipods

Habitat - NY Harbor

Other Info - Sample taken off of invertebrate growth on porcelain tiles.

Time Stamp-2:13 pm,9/17/14

Image #16 Magnification:_____