

# High School Marine Biology Research Projects

## Plankton Tow: Day vs. Night Communities

### I. Introduction

Plankton refers to free floating or weak swimming aquatic organisms that drift in water currents. They are distributed horizontally, vertically, and seasonally in water with the majority of plankton living in the photic zone, between 0-100m (Nybakken, 2001). The sunlight present in the photic zone is necessary for photosynthesis to occur in phytoplankton. In turn, zooplankton feed on plankton and other free swimming organisms feed on zooplankton. Therefore plankton is either directly or indirectly a source of food for most aquatic organisms and the base of the aquatic food web (Nybakken, 2001).

Plankton is primarily distributed by light but nutrient availability, climatic changes, and the presence of other plankton affect it (Nybakken, 2001). All of these factors result in the regional, climatic, seasonal, and time of day variance in plankton communities. Plankton thrives in specified conditions at the water's surface so these factors and the presence/ absence and abundance of plankton communities can be used as an environmental indicator.

To better understand the abundance and distribution of plankton communities in the Bahamas we will do several plankton tows during the day as well as at night to see how the time of day affects plankton.

**II. Research question:** How do relative time and condition affect the population size and variety of plankton in any given sample?

### III. Hypothesis

a. Null  $H_0$ : \_\_\_\_\_

b. Alternate  $H_a$ : \_\_\_\_\_

**IV. Prediction:** \_\_\_\_\_

### V. Materials

Plankton Tow:

- Plankton nets with cod ends
- Embroidery hoops with mesh
- Scrapers
- Large trays
- Collection jars
- Wash bottles
- Sharpie
- Masking tape
- Radio (Radio correspondence in a sheet protector)
- Work vests
- Close-toed shoes
- Digital camera
- Watch to keep time
- Fixative (alcohol)
- Small graduated cylinder
- Refrigerator

Lab:

- 5 microscopes
- Welled slides
- Pipettes
- Specimen jars
- Data sheets
- Pencils
- Folding table

## VI. Procedure

### Collection:

1. Radio to the captain to stop the boat and follow the radio command sheet assigned by the captain previous to experimentation.
2. Record time and weather conditions.
3. Have 4 people fill up 6 bottles, 2 bottles being wash bottles, with seawater (seal bottle lids after collecting water).
4. Tie the tow-nets to the cleats on star-board and port side of the boat.
5. Begin when the boat completely stops and is on station.
6. Tell the captain to start the boat. Tow the nets for approximately 10 minutes with constant communication between the captain and research leaders. **Caution: After deploying the nets, make sure all scientists are in a secure place before notifying captain to start the boat.**
7. After 10 minutes, radio up to the captain to stop the boat.
8. After the boat is stopped, untie the tow-nets and lift them out of the water at the same time.
9. Set up trays and rest of the materials in a place where the nets can be hung.
10. Hang the nets over the trays so that water doesn't spill onto the boat.
11. Spray the net to ensure that all contents end up in the jars.
12. Remove any excess debris from the net and spray with water bottle to ensure any attached plankton end up in jar.
13. Remove any excess debris from the net and spray with water bottle to ensure any attached plankton end up in jar.
14. Remove the jars from the bottom of the nets and place the contents onto the embroidery loops with mesh.
15. Pour 40 ml of sea-water into each specimen jar.
16. Scrape all of the plankton from the Embroidery loops and place the contents into the specimen jars.
17. Make sure that water levels of the jars are the same in both specimen jars.
18. Measure and pour 20 ml of rubbing alcohol into each specimen jar.
19. Cap jars and place them into the refrigerator.
20. Repeat steps for the other tows

**Processing Procedure:**

1. Make sure jars are well mixed.
2. Put one drop from jar one into the well of the slide from each tow.
3. Use a microscope to observe and record population size and general variety based on common characteristics.
4. Record the number of plankton on the data sheet.
5. Rinse off slide.
6. Repeat steps one through five with a second drop from jar one.
7. Repeat steps one through six, using jars two, three, and four.

**Literature Cited**

Nybakken, James W. and Mark D. Bertness. 2001. *Marine Biology: An Ecological Approach*. California: Benjamin Cummings.