Distribution of Sessile Recruits on Different Substrates and Angles

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Pattern

In the Intertidal, animals are distributed unevenly along many ecological conditions. One appears to be wave exposure, another may be substrate type.
Pattern

Background

• Biogeographical Province – California Current Province
  • Cold, nutrient rich waters
• Rocky, exposed coastline, strong upwelling.
• Flat Benches: Santa Cruz Mudstone
• Major spp. Include: Mytilus californianus, Pollicipes, Macrocystis pyrifera, Ulva sp., Balanus glandula
Goal

To determine the differential recruitment of invertebrates on three major types of substrate, at three different angles to the waves.

General Hypothesis I

Variation in the angle of inclination to the waves causes variation in the amount of species diversity in recruiting planktonic larvae.
Specific Hypotheses

• A substrate at a 45 degree angle to the water will have the greatest species diversity because this substrate suffers an intermediate amount of wave impact.

• Substrates with greater or lesser angles to the water than 45 will show less diversity due to greater/lesser wave impact.

• **Null Hypothesis**: The different test angles will show no statistical difference in species diversity.

General Hypothesis II

Different types of planktonic larvae will recruit to different types of substrate.
Specific Hypotheses

• Organisms that attach easily to flat, smooth substrates, such as anemones, will recruit to increased numbers on sandstone, a sedimentary rock.
• Organisms that attach easily to rocks with cracks and crevices, such as mussels, will recruit in larger numbers on granite, an igneous rock.
• Quartzite, a metamorphic rock that can be either smooth or pitted, will attract a mix of colonial organisms and hydroids.
• **Null Hypothesis- Different substrate types will not exhibit any significant differences in the taxonomic makeup of recruiting planktonic larva.**

Materials and Methods
Sandstone  Granite  
Quartzite  Rocky Intertidal

**Materials**
- Poles
- Scrappers
- Blow Torch
- AWS-125 Circular Wet Saw
- Substrates
Preparing the Control

Control for experimental setup

- Take chunks out of rocky intertidal, put in squares of substrate types at naturally found angles of inclination
  - “Pole Control 1”
- Take chunk of rocky intertidal and put into pole set up. Test at all angles.
  - “Pole Control 2”
Preparing the Experimental
Preparing the Experimental Period

- 2 weeks in mid April, during the tail end of the phytoplankton bloom.
- Take substrates back to lab and analyze for diversity using Shannon-Weiner index.
The Effect of the Angle of Inclination on Diversity

Predicted Results

Null Hypothesis

Angle of Inclination (Degrees) vs. Number of Species

- Angle of Inclination Effects Diversity
- Null Hypothesis Correct

0 10 20 30 40

0 50 100
The Effect of Substrate Type on Larval Type

Substrate Effects Larval Type

Null Hypothesis Correct

Substrate Type

Percent Cover (%)

Colonial Organisms
Mollusks
Arthropods
Cnidarians