NO EVIDENCE OF KIN COMPETITION FOR FOOD IN A FILTER-FEEDING MARINE BRYOZOAN

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Husbandry

Introduction

- Collected *Bugula neritina* from FSU Coastal and Marine lab on November 29, 2021.
- Spawned in the lab and settled on February 7, 2022.

Methods

Preparation

1. Spawn collected colonies using a light treatment in an incubator.
2. Separate offspring into individual bowls of approximately 200 mL of seawater.
3. Prepare feeding solution (refer to steps 1-3, 9-18 from "husbandry methods") and feed colonies.
4. Leave in an incubator set at 24.5°C on a light/dark cycle. Half the lights turn on for 4 hours, and then the other half of the lights turn on. Total of 16 hours of darkness.
5. Complete basic husbandry after settlement for 3 weeks until time to conduct feeding trials.

Water Changes

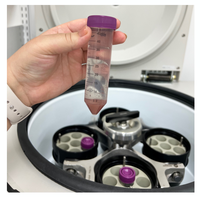
1. Transfer all colonies into clean bowls with approximately 200 mL of clean seawater (100% water change).

Feeding

1. Collect 400 mL of *Rhodomonas lens* culture and distribute into 50 mL centrifuge tubes.
2. Spin tubes in a centrifuge set at 300 RPM for 20 minutes at 20°C with max acceleration and slow deceleration.
3. At the end of the cycle dispose of supernatant and resuspend in 20 mL of clean seawater.
4. Use pipette to collect remaining liquid at the bottom of tubes and redistribute into the feeding solution.
5. Use a 100-1000 µl micropipette to distribute 400 µl to each of the bowls.
6. Place colonies in the new, clean bowls into the incubator until the next feeding and water change.

This process was completed three times a week for three weeks until the feeding trials were conducted.



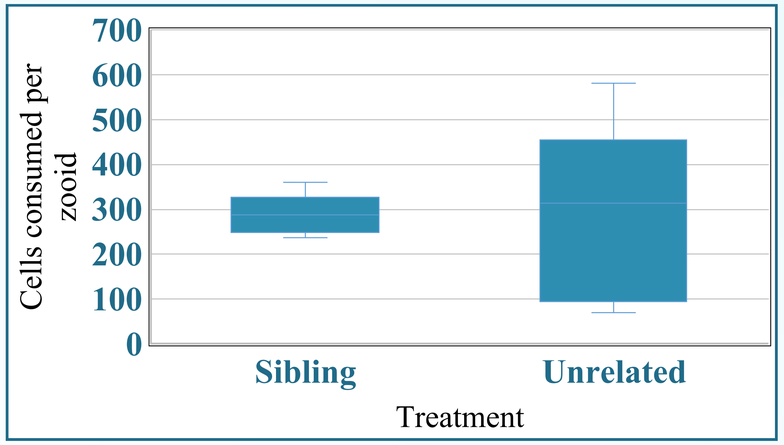



Feeding Trials

Abstract

Collecting data on feeding habits of marine bryozoans will provide insight into the effect of kin competition. Genetically related colonies were compared to unrelated colonies. Kin share similar phenotypes that express similar preferences which can cause competition for a specific resource. This study is still in the early stages but will conclude what proximity to siblings affects competition for food in a marine bryozoan. Initial results show that kin competition within a density of three colonies, at the age of three weeks, when competing for 23,553 cells/mL has no effect.

Analysis and Discussion



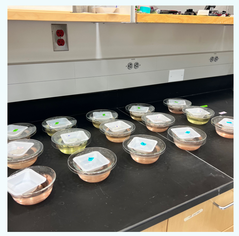
Box and whisker plot showing the algal cells per zooid of sibling and unrelated treatment groups after feeding. There were five samples in each group with three colonies per group. No significant difference between the two treatments.

- Hypothesis: Sibling groups have higher feeding rates compared to the unrelated groups.
- Null Hypothesis: Kinship does not affect food competition in the marine bryozoan *Bugula neritina*.
- P value = 0.9585, Degrees of Freedom = 4.4242, T value = 0.055068
- The P Value fails to reject the null hypothesis because it is significantly higher than 0.5.
- Therefore, kinship does not affect food competition in the marine bryozoan *Bugula neritina.*
- Final calculation accounted for natural algal cell fluctuation.
- Future experiments could look at the kin competition for food at different ages because when they are older the colonies will have more zooids to feed with. Competition may not play a role until there are more zooids that cause a scarcity of algae that was not present when smaller.

Methods

Feeding Trials

- Organize colonies by size: small, medium, and large (bifurcated)
- Arrange colonies so that there are 5 siblings/unrelated in the small group, 10 siblings/unrelated in the medium group, and 10 siblings/unrelated in the large group.
- Collect 900 mL of *Rhodomonas lens* culture and distribute into 50 mL centrifuge tubes.
- Spin tubes in a centrifuge set at 300 RPM for 20 minutes at 20°C with max acceleration and slow deceleration.
- Prepare 15 bowls with exactly 200 mL seawater containing one weigh boat with 3 cuts in each.
- Prepare feeding solution (refer to steps 27-30 from "Methods: Feeding") - average concentration was 23,553 cells/mL.
- Stir the algae solution in the bowls to evenly distribute.
- Use a 100-1000 µl micropipette to collect 1mL sample from each of the 15 bowls.
- Use a hemocytometer to take three pictures of each sample under the microscope for a total of 45 "start" photos.
- Redistribute colonies into new weigh boats.
- Let colonies feed for 20 hours.
- After 20 hours of feeding, remove colonies from bowls and use a 100-1000 µl micropipette to collect 1mL sample from each of the 15 bowls.
- Use a hemocytometer to take three pictures of each sample under the microscope for a total of 45 "end" photos.
- Count zooids on each of the colonies and algal cells in all 90 photos.


Acknowledgements and References

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Okamura. (1984). The effects of ambient flow velocity, colony size, and upstream colonies on the feeding success of bryozoa. I. Bugula stolonifera Ryland, an arborescent species. *Journal of Experimental Marine Biology and Ecology, 83*(2), 179–193. https://doi.org/10.1016/0022-0981(84)90044-3