Absorbing Knowledge: Insights on Survival from the sponge *Leucilla nuttingi*

UC DAVIS EARTH AND PLANETARY SCIENCES

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Introduction

- Ocean acidification (the absorption of CO_2 gas in ocean water) is affecting the health of calcareous organisms in our oceans.
- The smooth urn sponge (*Leucilla nuttingi*) contains calcium carbonate spicules that are potentially harmed by lower pH.
- Traditional Ecological Knowledge, like the usage of shell hash, along with other forms of calcium carbonate supplementation have the potential to create a buffering effect on acidic water. This has the potential to prevent decay in calcium carbonate dependent organisms.

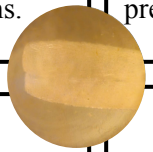

Figure 1: Individual sponge before experiment

Hypothesis

Adding calcium carbonate-rich substrates will increase survivorship in *L.nuttingi* by decreasing weight loss, and by maintaining DNA concentration and spicule weight.

Legend: Figure 2

- Boxplot A: The differences between initial and final sponge weights of samples (g)
- Boxplot B: Weight of DNA (ng/µL)
- Boxplot C: Weight of sponge spicules (mg)

Methods

- *L.nuttingi* were collected from tide pools at Shell Beach in Bodega Bay, CA.
- We prepared shell hash and calcite substrates by grinding them down to a powder.
- We arranged ten 5mL wells per variable (control, shell hash and calcite) and added seawater.
- We selected 30 sponges that were similar in size, and separated them from their colony. We added them into unique treatments.
- Over 3 days, we manually changed water daily.
- Final weights were taken, and samples were prepared for either DNA or spicule analysis.

Results

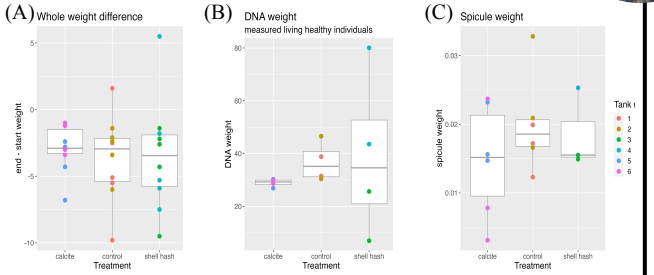

Figure 2: Box plots showing the results of our study. (A) Change in weight over the course of the experiment. (B) Concentration of DNA (C) Weight of spicules

Results Cont.

- After conducting single ANOVA tests for each variable, and a multivariate analysis with the the combined dataset, we found that the differences in sponge weight loss, DNA weight, and spicule weight were not statistically significant in any treatment, as indicated by the following P values:

DNA weight: 0.227
Spicule weight: 0.492
Overall weight: 0.847
Multivariate analysis of aggregated data: 0.864

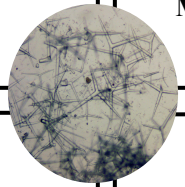

Figure 3: Spicules from sample in calcite substrate

Future work

- Increase sample size to potentially obtain statistical significant data
- Test colonies instead of individual sponges

Thanks

UC Davis Bodega Marine Laboratory, the National Science Foundation