The Biodiversity Of Zooxanthellae Based On Fluorescence

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Abstract

- The purpose of study is to identify zooxanthellae in coral based on fluorescence. This project is based on my research and study on a specific type of coral. And are there correlations between the type or family of corals and the type of zooxanthellae found within those corals?
- My methods consisted of collecting a sample of coral, specifically a sample of coral you have not done yet or one that interests you the most from the soft Sinularia coral group. Cut off a small sample with cutting pliers and insert it into a Micro-Centrifuge test tube. And mash the coral sample until it is a somewhat paste texture depending on the type of coral. Then move the test tube into a centrifuge and put it on 13x100 for 10 minutes. Then take it out and remove the Zooxanthellae with a pipettor and place it back into a test tube until further examination.
- Look at the Zooxanthellae collected under a microscope at 100x and 400x. When doing this only put a small amount of Zooxanthellae on the slide and store the rest away. When done, take the stored away Zooxanthellae and label it and then put it into the freezer. And for the rest of the methodology use the methodology from Cold Spring Harbors, Using DNA Barcodes to Identify and Classify Living Things. And then after performing gel electrophoresis on the samples, send your best samples to get sequenced. After you get your results back the results from the sequencing, put them into DNA Subway and follow DNA Subways Fast-track to Gene Annotation and Genome Analysis procedure.

Introduction

- Since they are classified as the same type of coral sample it is a possibility for them to share the same type of Zooxanthellae based on fluorescence and other factors.
- There is a response of these different depths on photosynthesis would result in the Zooxanthellae changing faster than other responses of coral when their symbionts are faced with the same stress. It also states how chlorophyll fluorescence of Zooxanthellae is closely related to the growth of corals.
- In theory knowing what type of Zooxanthellae correlated with a certain type of coral would be helpful because it would help people acknowledge that if a coral is struggling they would know the specific species of Zooxanthellae it would need.

Materials & Methods

The materials used were:

- A centrifuge
- Coral
- A small pestle
- Pipettor
- Microscope
- dH_2O
- Silica resin
- Thermal cycler
- SYBR Green
- Test tubes (Micro-Centrifuge or regular Centrifuge tubes)
- A filtration device
- Cutting pliers
- Pipettor tips
- Microscope slides
- Lysis solution
- Wash buffer
- Agarose
- PCR reagents

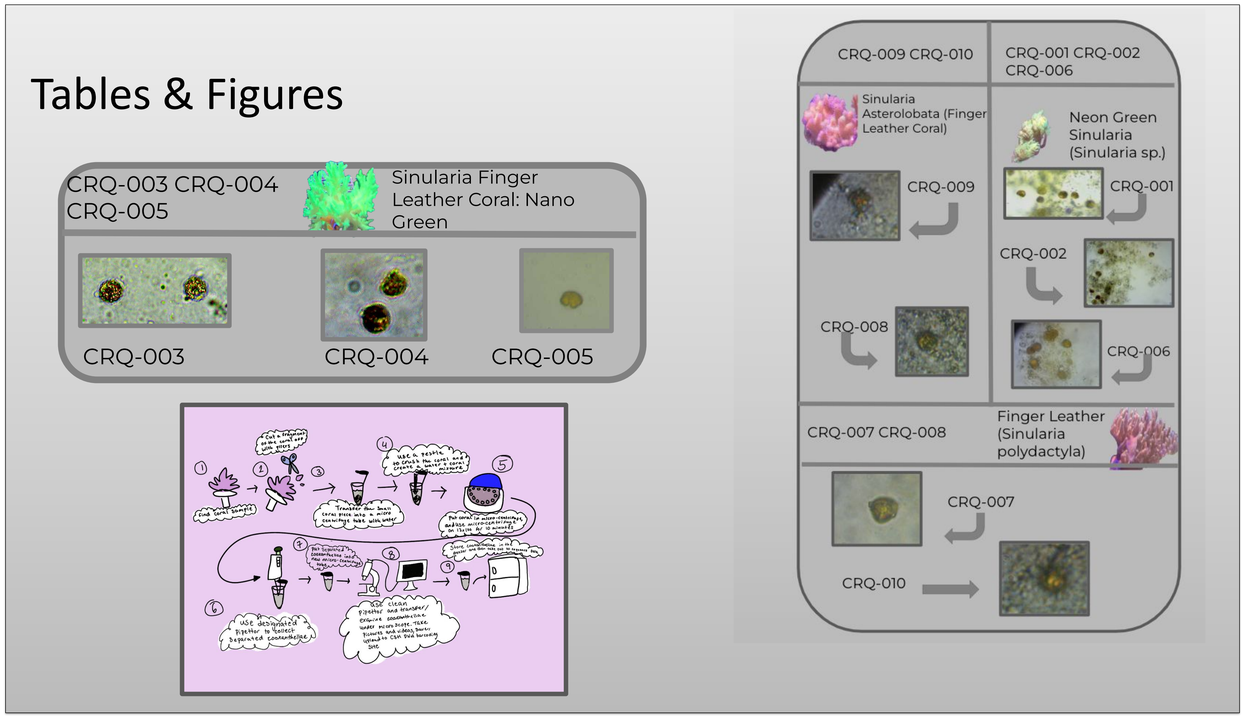
How the materials were used:

- Collect a sample of coral, specifically a sample of coral you have not done yet or one that interests you the most. Cut off a small sample with cutting pliers and insert it into a Micro-Centrifuge test tube.
- And mash the coral sample until it is a somewhat paste texture depending on the type of coral.
- Then move the test tube into a centrifuge and put it on 13x100 for 10 minutes.
- Then take it out and remove the zooxanthellae with a pipettor and place it back into a test tube until further examination.
- Look at the zooxanthellae collected under a microscope at 100x and 400x. When doing this only put a small amount of zooxanthellae on the slide and store the rest away. When done, take the stored away zooxanthellae and label it and then put it into the freezer.
- And for the rest of the methodology use the methodology from Cold Spring Harbors, Using DNA Barcodes to Identify and Classify Living Things.
- And then after performing gel electrophoresis on the samples, send your best samples to get sequenced.
- After you get your results back the results from the sequencing, put them into DNA Subway and follow DNA Subways Fast-track to Gene Annotation and Genome Analysis procedure.

Results

- We did not collect any results this time around because our samples were not able to conduct anytype of zooxanthellae identification.But if we were to have samples to be sequenced we would have gotten our results from having our samples sequenced.
- Then we would have run them through DNA Subway along with their protocol from DNA Subways Fast-track to Gene Annotation and Genome Analysis. And we most likely would have identified a type of symbiotic zooxanthellae.
- Some errors that can be met in DNA Subway are system errors, one could have been that we could have trimmed the DNA wrong which led to an error.

Tables & Figures



Discussion

Our project was the cultivation of zooxanthellae in different types of corals through DNA Barcoding. Our hypothesis is that the same type of zooxanthellae will be found in all of the coral samples. We hoped to find symbiotic dinoflagellates in the genus Symbiodinium. Which hypothetically could have been done but we were not able to do it because of a lack of time.Even after collecting 10 samples of different types of zooxanthellae i was unable to sequence any of them. We thought this study was very important because if you can figure out what type of zooxanthellae a coral needs it could benefit the coral in so many ways, examples being change in coral health and coral color. And if we were more thorough with collecting samples and taking more time on analyzing it would have led to more accurate results. Which is probably the reason why we did not have successful sequenceable results. People should care about this experiment because it can benefit the coral reefs around the world with more thought put into it. Our suggestion for someone planning on doing research like this or who is doing similar research to be more focused on their samples. We were not confident in what we saw in our samples in the beginning. But in the end we think if we had more time and had better resources we could have collected sequenceable samples. We had background knowledge because our prior research also focused on zooxanthellae, to get a better understanding of zooxanthellae and figure out an effective way to extract it from coral. What we took away from this project is that the Scientific process was not easy but it is worth experiencing and going through all the steps. Overall, we wish to conduct more research on Zooxanthellae because of the different types that can be found. And to continue our learning on zooxanthellae because of how it can impact coral health.

References

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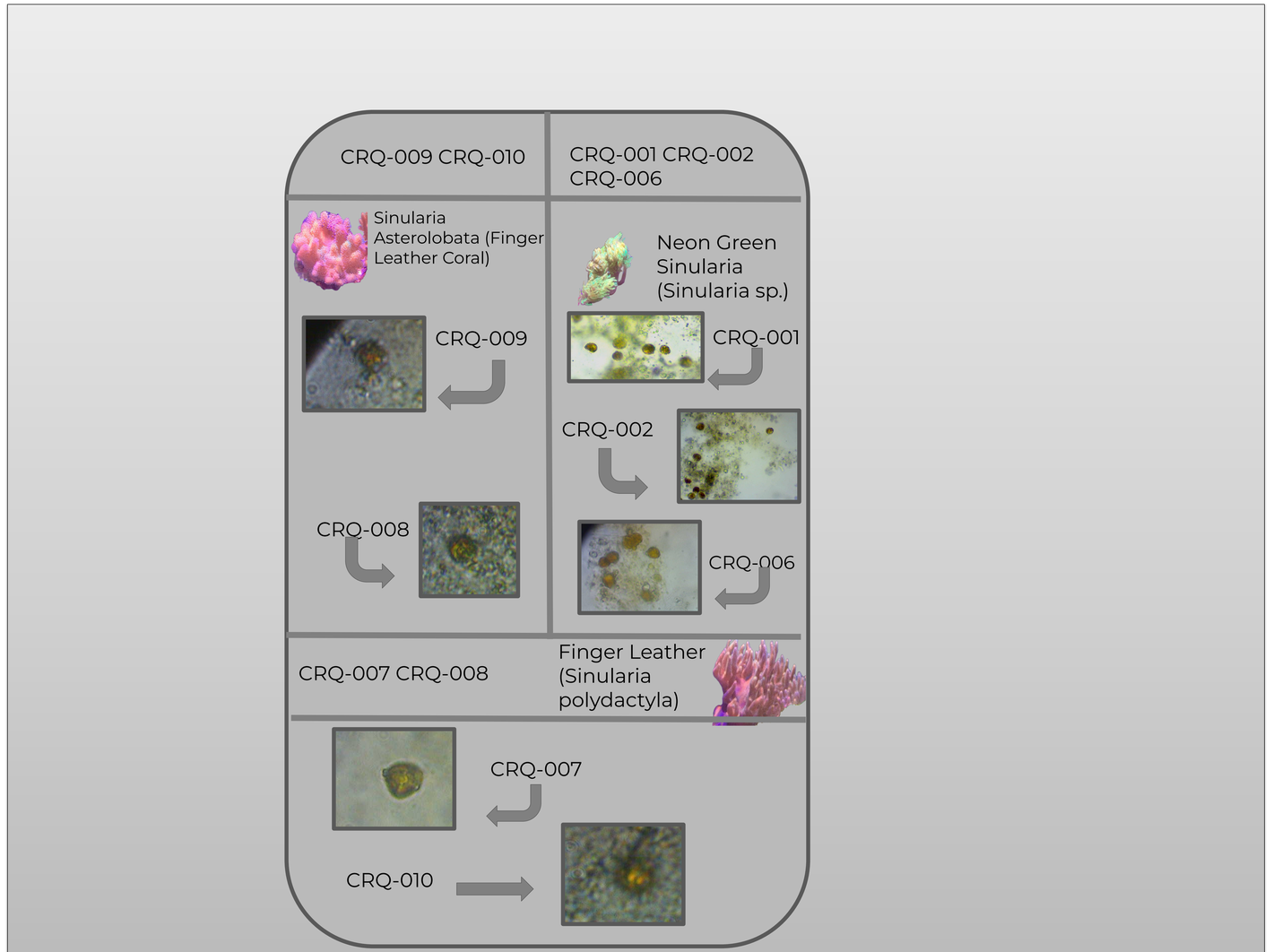
Acknowledgements

We first off would like to thank Cold Spring Harbor DNA Laboratory for being a big help with our project. We would also like to thank our school, Walt Whitman High School, and Fish Life Aquariums.


CRQ-009 CRQ-010
CRQ-001 CRQ-002 CRQ-006
Sinularia Asterolobata (Finger Leather Coral)
Neon Green Sinularia (Sinularia sp.)
CRQ-009
CRQ-001
CRQ-002
CRQ-008
CRQ-006
CRQ-007 CRQ-008
Finger Leather (Sinularia polydactyla)
CRQ-007
CRQ-010