

Impact of Nutrient Enrichment on Warty Sea Anemones' Growth Dynamics: A Coastal Ecosystem Perspective

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Background

Nutrient imbalances in coastal systems, including those caused by excess nutrients, may have important effects on marine species. I sought to experimentally determine connections between Warty Sea Anemones (*Bunodosoma cavernatum*) and nutrient levels.

Introduction

This study aims to investigate how nutrient elevation (such as that driven by nutrient pollution) affects the growth of Warty Sea Anemones from Caspersen Beach, FL. It has been proposed that anemone reproduction and population growth is aided by excess nutrients from human runoff, which fosters bacterial blooms. By evaluating anemone health and reproduction across experimentally manipulated nutrient levels, my study seeks to understand the effects of nutrients on important taxa from coastal ecosystems. These results may have broad relevance for marine conservation and restoration efforts.

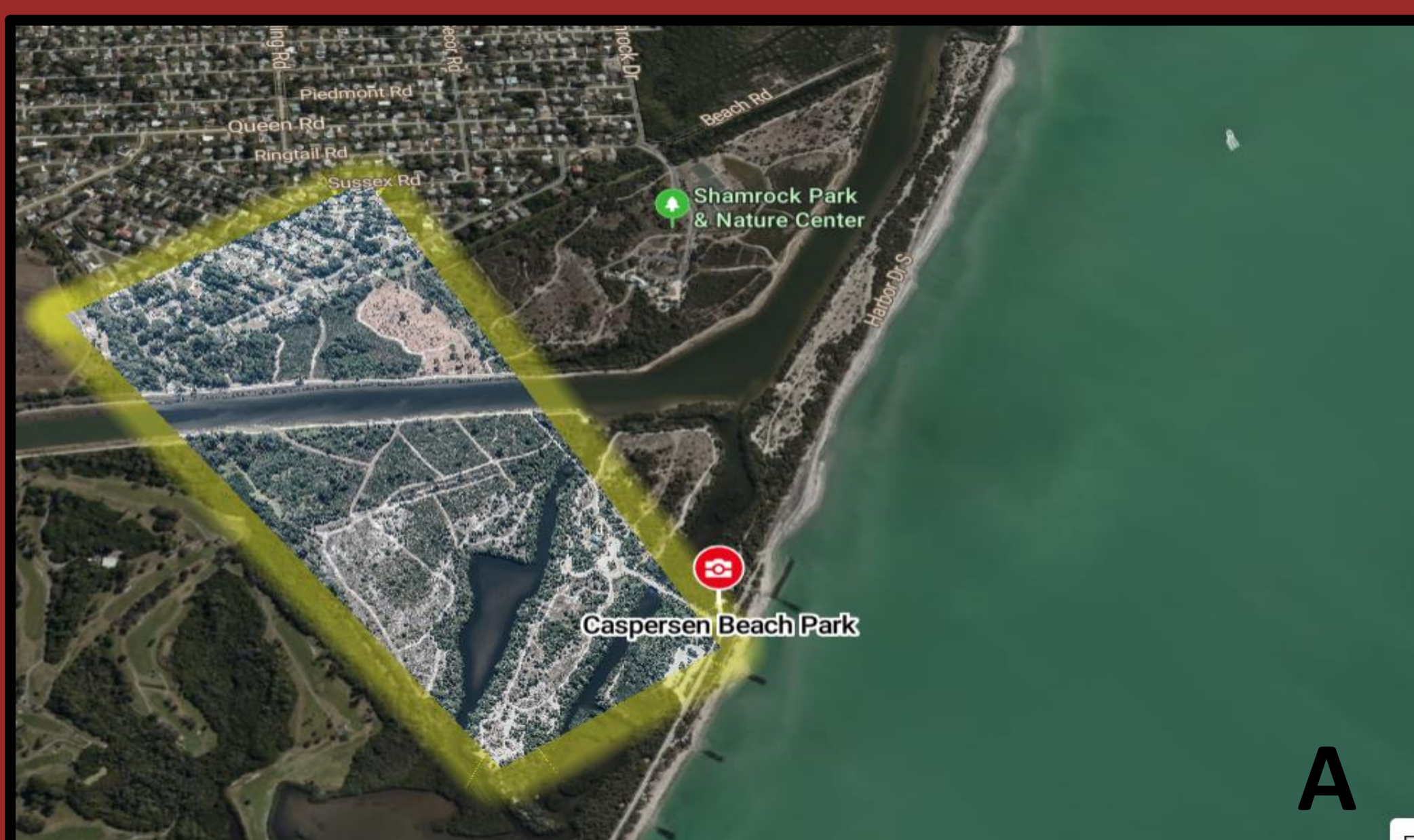


Figure A: Residential and coastal view of Caspersen Beach, FL.

Methods

To collect Warty Sea Anemones, the (1) **Protocol for Safe Collection of Warty Sea Anemones** was followed. Experimental habitats, based on the (2) **Warty Sea Anemone Housing Protocol**, were set up to provide conditions suited to the anemones' needs, and were separated into low, medium, and high nutrient levels. The (3) **Nutrient Management Protocol** was then utilized to systematically control and assess nutrient enrichment effects.

Experiment Protocols



(1) Protocol for the Safe Collection of Warty Sea Anemones



(2) Warty Sea Anemone Housing Protocol



(3) Nutrient Management Protocol

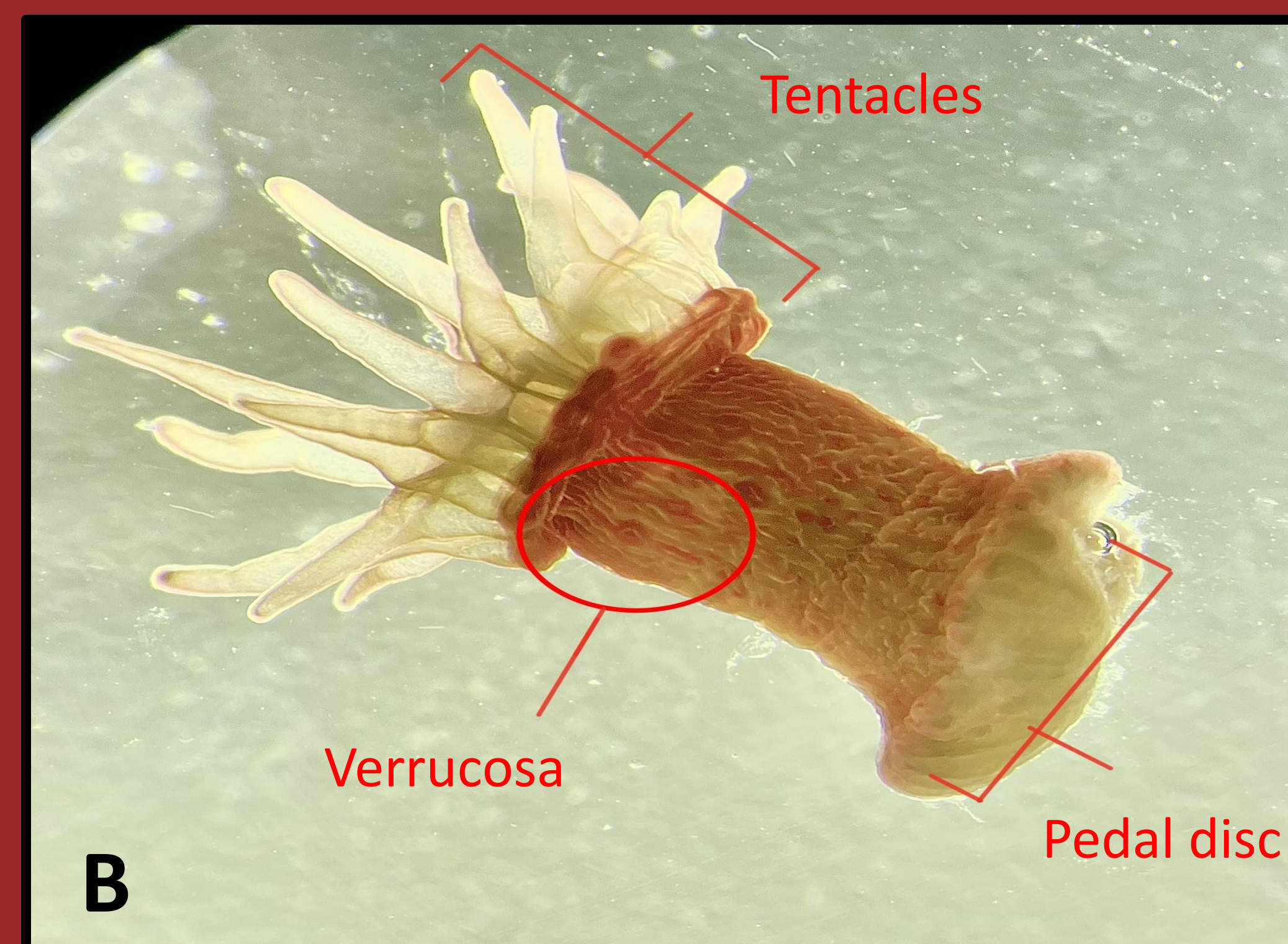


Figure B: Microscopic anatomy view of Warty Sea Anemone

Anemone Stress Response

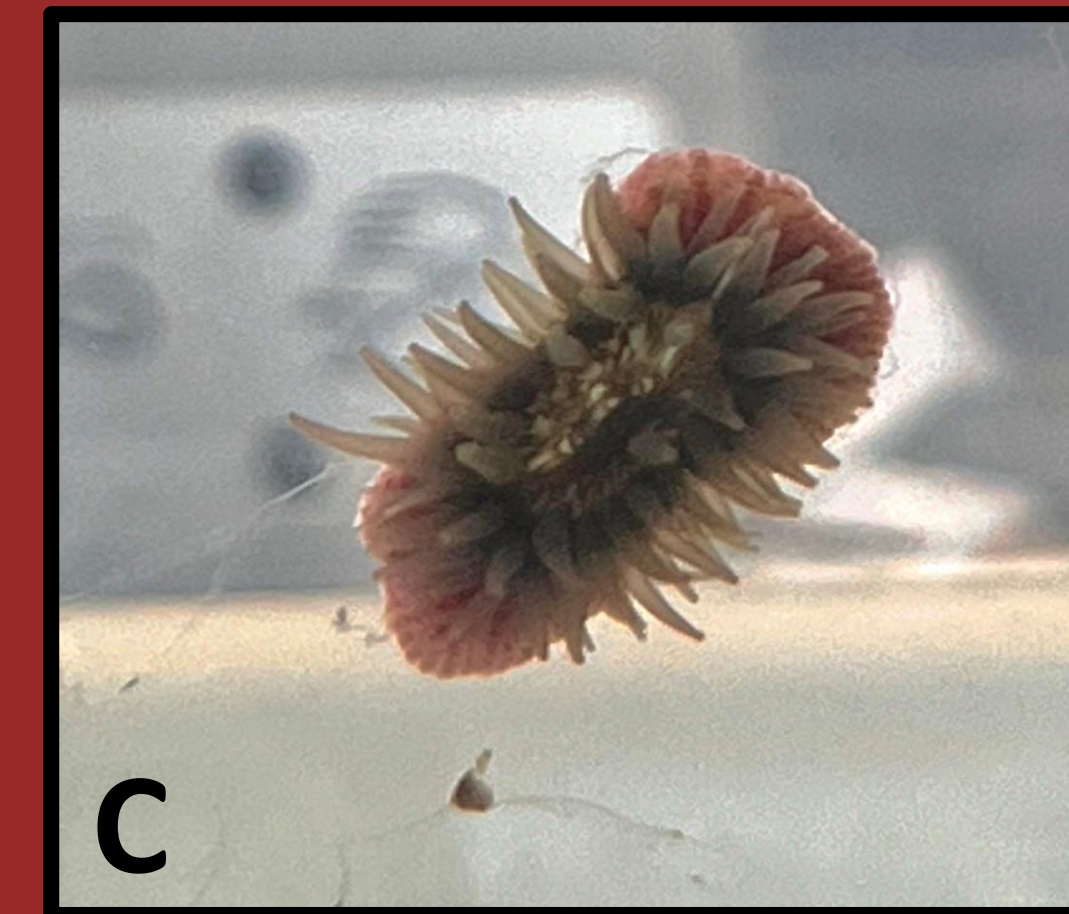


Figure C: Warty Sea Anemone in the process of "splitting" into 2 copies of itself. (Anterior view)

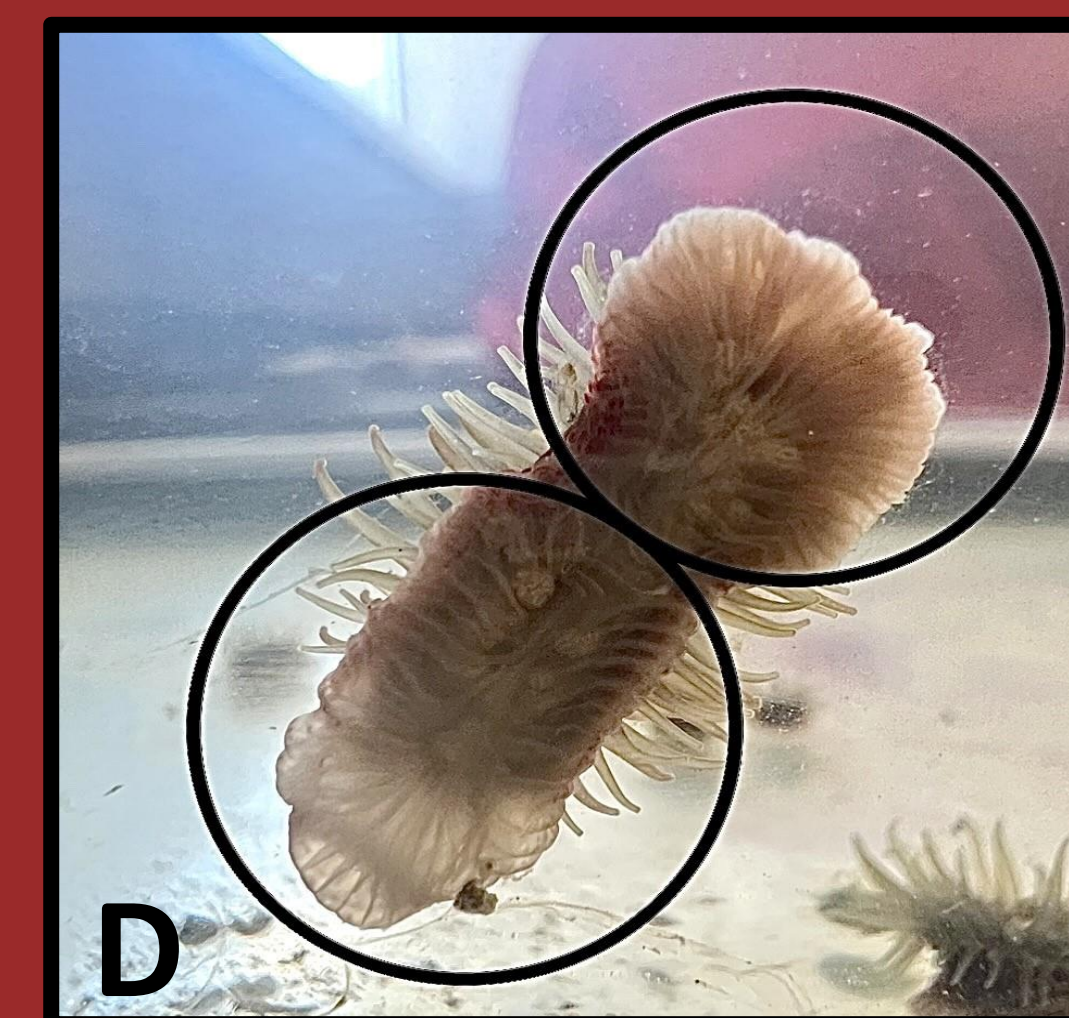


Figure D: Warty Sea Anemone in the process of "splitting" into 2 copies of itself. Notice the two fully mature gonadal organs. (Posterior view)



Figure E: Warty Sea Anemone cluster excreting its symbiotic golden-brown zooxanthella

Results

The experiment is currently underway with results forthcoming. Some preliminary findings are available from the acclimation period. During the acclimation period, I observed a variety of anemone responses that provide baseline data for the experiment. These responses include self-replication by splitting, the expulsion of zooxanthellae, and, in some cases, death. These outcomes will be valuable response data following administration of the nutrient treatments.

Preliminary Results

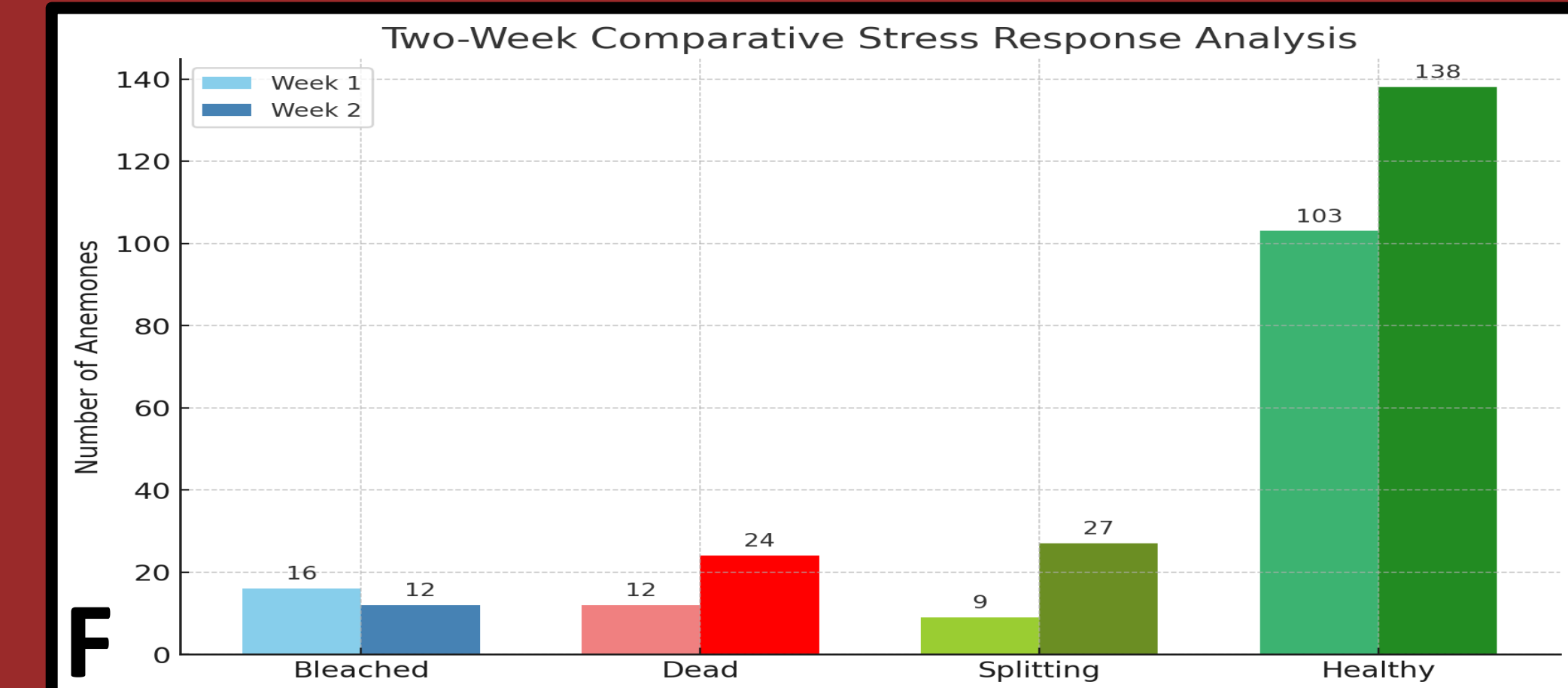
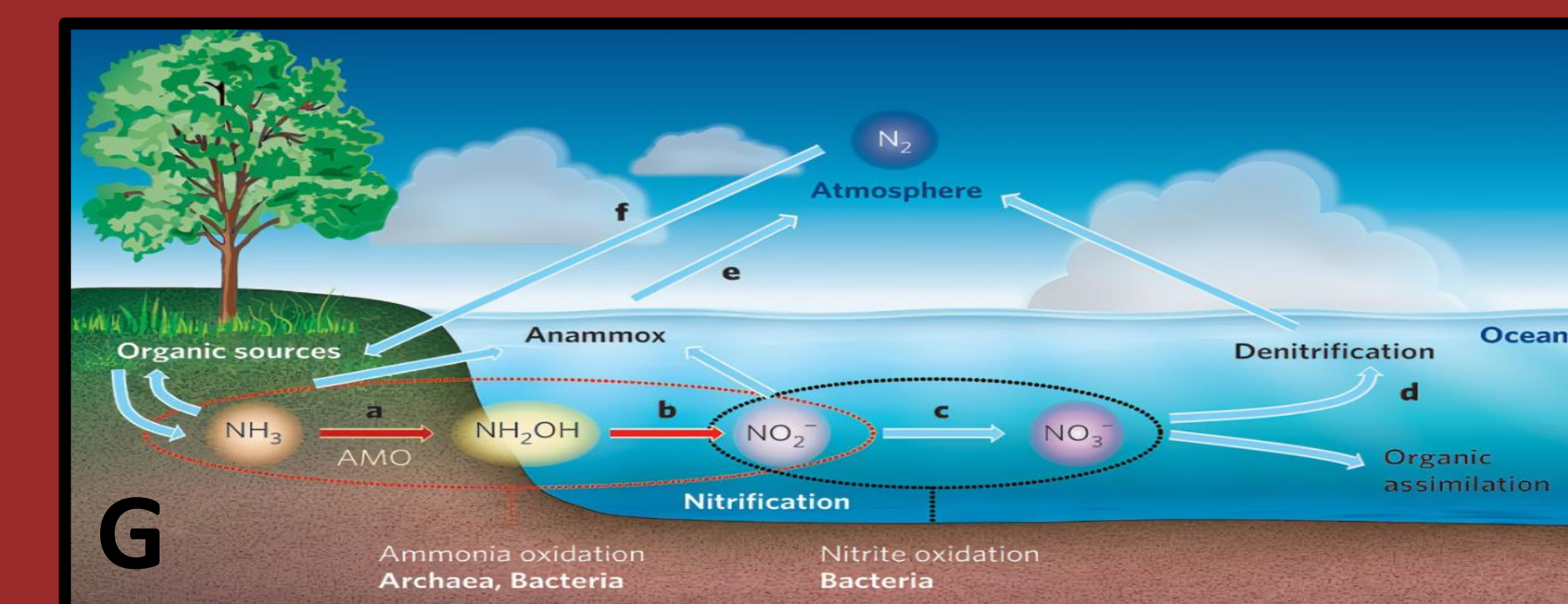


Figure F: Recorded stress responses of the warty sea anemones during the second week of acclimatization.

Discussion

During the acclimation period the tank underwent the **nitrogen cycle (G)**.



Most anemones (165) thrived, with 27 anemones splitting, this adaptability allows these anemones to thrive where many corals cannot. These stress responses require further investigation as their zooxanthella algae may be influencing algal blooms.

References

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Protocol for the Safe Collection of Warty Sea Anemones

Warty Sea Anemone Housing Protocol

Nutrient Management Protocol