

**Fantastic Urchins and Where to Find Them: Location of *Diadema antillarum* in
Relation to Height**

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Abstract:

Diadema antillarum, the long-spined sea urchin was sampled to determine if there was a relation to the height of the individual urchin, and the location it could be found in the reef during the day relative to coral outcroppings. It was found that, while not statistically significant, there was still a trend towards larger sea urchins being found farther away from coral outcropping than their smaller counterparts.

Introduction

The long-spined sea urchin, *Diadema antillarum*, is a small reef creature that lives in the reefs of South Florida, The Bahamas, the Caribbean, Bermuda, and south to Brazil. These Urchins usually take shelter during the day, and at night they “scavenge and feed on algae turf along coral reefs”¹. In this case, the urchins in Pete’s Reef on the northwestern side of Isla Colon, about a mile south of Bocas del Drago, were studied to determine if there was a connection between the size of the Sea Urchin and where it chose to temporarily reside in the daytime. The working hypothesis for this study was that the smaller Sea Urchins would stay closer to coral objects as these locations would provide better protection for the creature. For future studies focused on Long-Spined Sea Urchins, it is important to understand where they may inhabit and where they could be found. This could be a nice introduction to the scientific world since there are minimal prior studies that support the same or similar hypothesis in accordance to Urchin size and location.

Materials and Methods

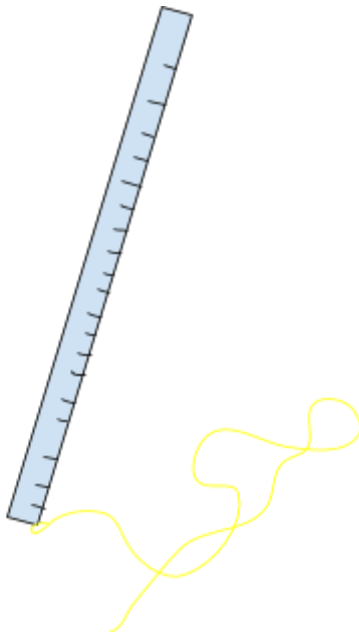


Figure 1, a diagram of the measuring device used in the study

To conduct this study, snorkeling equipment, a PVC pipe with precise measurements up to 100 centimeters, a yellow rope with measurements labelled with black sharpie at every 5 centimeters for 400 centimeters, and a slate to record data were used. A specific plot, alongside the tail end of the reef, was made to create a more specific location in which urchins dwelled that was looked through to gather data for each urchin in the area. With the efforts of two people, one person held the pipe next to the urchin with enough distance as to not injure the fragile marine life, and the other dove down to examine the maximum height where the urchin’s spines ended and recorded that data. To measure distance, one person held the pipe alongside the urchin similarly to how it would be held when recording height, and the other took the rope and swam to the nearest coral outcrop that would offer the urchin protection, or a piece of coral larger than the urchin itself, and compared

¹ Reef Creature Identification: Paul Humann, Ned Deloach, and Les Wilk

the line on the rope to the measurements on the PVC pipe. This second person then recorded that measurement as the distance from the urchin to the coral.

In figure 2, it depicts roughly the plot of sea that was investigated for urchins. As one can see, it is directly against the main section of Pete’s Reef. Data collection started at one edge of the plot and then combed through across to the other side each day.

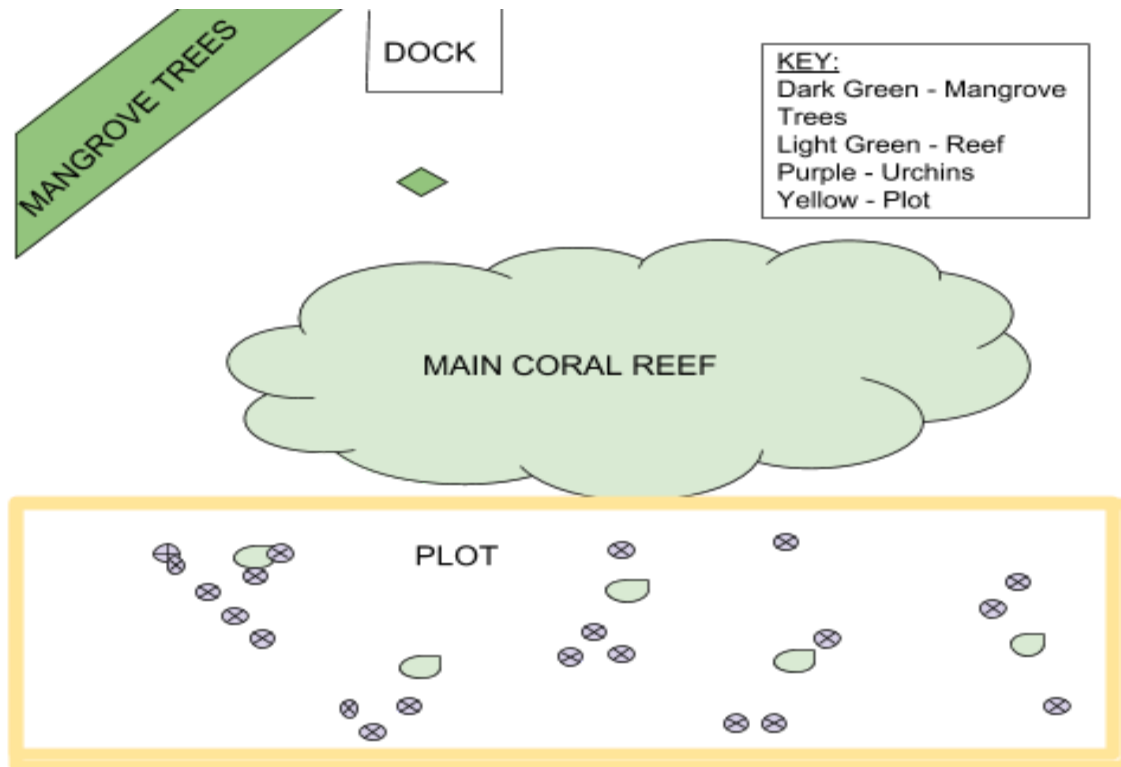
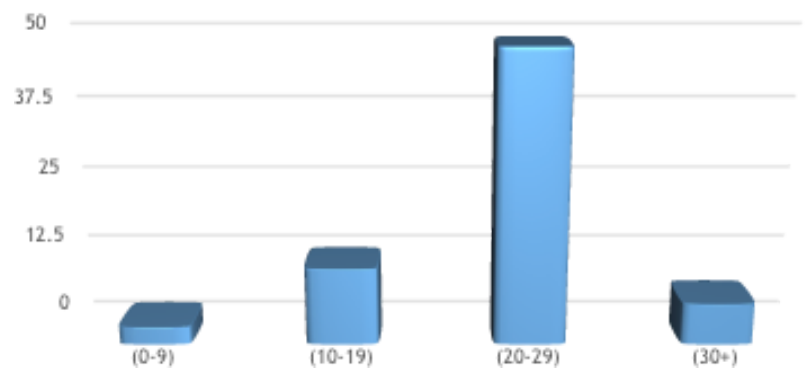


Figure 2: A image depicting the plot researched within Pete’s Reef.

Results

It was found that there was a small correlation between the height of an Urchin and its distance from substantially sized coral objects that could provide shelter for the urchin. Specifically, smaller sea Urchins were less likely to be farther away from the coral objects than the larger Urchins. The majority of the urchins that we caught were

Amount of Urchins per Size Class



between the heights of 20-29 cm, and there was a lot of variance in the data from this group, as can be seen in figures 2 & 3.

Figure 3: A bar graph that shows how many Urchins were measured per height group.

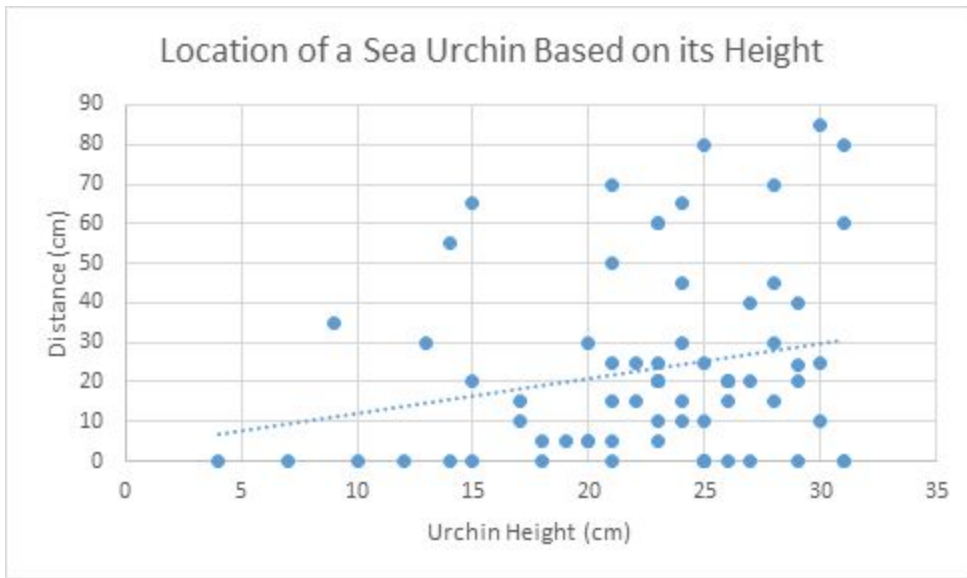


Figure 4: A scatterplot graph that shows the relationship between Urchin height and location.

From this data, a trend line was formed to align with the points that we had with an r^2 value of 0.04928. Additionally, a p-value was derived from the information of 0.06091, almost making a significant relationship between Sea Urchin height and location.

Discussion

As shown in figure 4, there is a slight positive trend towards larger urchins being more likely to be found further away from coral outcroppings. However the graph shows how it is unlikely to find small urchins far away from the coral, while larger ones can be found at both near and far distances. While it may not be significant, we can still see that there is a difference between the locations that different sized sea urchins choose to stay. This could be because, as

hypothesized the smaller urchins require the coral as protection, so it would be hard to find smaller ones further away from these areas, because they would be less likely to stay alive. An idea for why the larger ones are found at more varying distances could be that, while they have the ability to stay further away from the coral and survive, the coral could still be a valuable survival resource and, with their larger size, they might be able to take the area for themselves.

Sources of error

There are a few possible sources of error that could have affected these results. One was that if counted more than once, a single urchin could affect the average of the group. However this would only occur if the same urchin was counted twice in the same day, as the urchins shift during the night, the locations they are found in the next day are still separate data points. Another source of error was that in each case of measurement, a location that was determined to be the “closest coral object that can provide cover” was decided upon, this was chosen on a case by case basis, and there could be inconsistencies in the methods used to decide.

Conclusion:

In this study, it was discovered that there is a trend where smaller *D. antillarum* are closer to coral outcrops during the day. This supported the hypothesis that the smaller Urchins needed the corals for further protection whereas the larger Urchins could reside farther away. In the studied area, there were minimal large coral outcrops, but when found there were many times a small Urchin nestled inside or along its side. While the results were not significant, these findings revealed the importance of protecting coral and marine life. Coral is used both to feed and to protect these Urchins and other creatures. These results could also be used in future studies to aid those in finding Urchins of a more specific size in correlation to their closest reef.

Literature Cited:

Humann, P., DeLoach, N., & Wilk, L. (2013). *Reef creature identification: Florida, Caribbean, Bahamas*.