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# Structural Preference of Banded (*Ophiolepis apressa*) and Reticulated (*Ophionereis reticulata*) Brittle Stars

Sophie Stoffers & Jillian Neudahl – Kristina Timmerman & Trevor Keyler

## Introduction

- Research was conducted on the structural preference of brittle stars (*Ophiordermatidae*) collected from the shallow coastal areas, San Salvador Island, Bahamas.
- These marine organisms feed during the night and hide within dark areas of the ocean such as rocks and conch shells during the day (Georgia Aquarium, 2022).
- We hypothesized brittle stars had no preference for the structure they chose to hide in during the daytime. Based on this hypothesis, we predicted that brittle stars would utilize all structural areas equally.



Figure 1. Left illustrates the phenotype of the reticulated brittle star (*O. reticulata*) and on the right, the banded brittle star (*O. apressa*). Photos: Stoffers and Neudahl.

## Methods

- Two species of brittle stars (*Ophiolepis apressa* and *Ophionereis reticulata*; Figure 1), were collected from Graham's Harbor on the northeast point of the island.
- Six reticulated brittle stars and three banded brittle stars were presented with hiding structures including: crab shell (A), crab claw (B), mollusk shell (C), rock structure (D), broken plastic cup (E), conch shell (F), and coral (G) (Figure 3).
- On March 10<sup>th</sup> and 11<sup>th</sup> (2022) and every hour for six consecutive hours, brittle star locations were identified within a tank (Gerace Research Center). Brittle stars were then removed and placed in the center of the tank to reset their location.
- Collection occurred over the course of two consecutive days, and each day the structures were rearranged in the tank as demonstrated in figures 3, 4 and 5.



Figure 3. Location of structures on day one for data collection in wet lab of Gerace Research Center, San Salvador, Bahamas

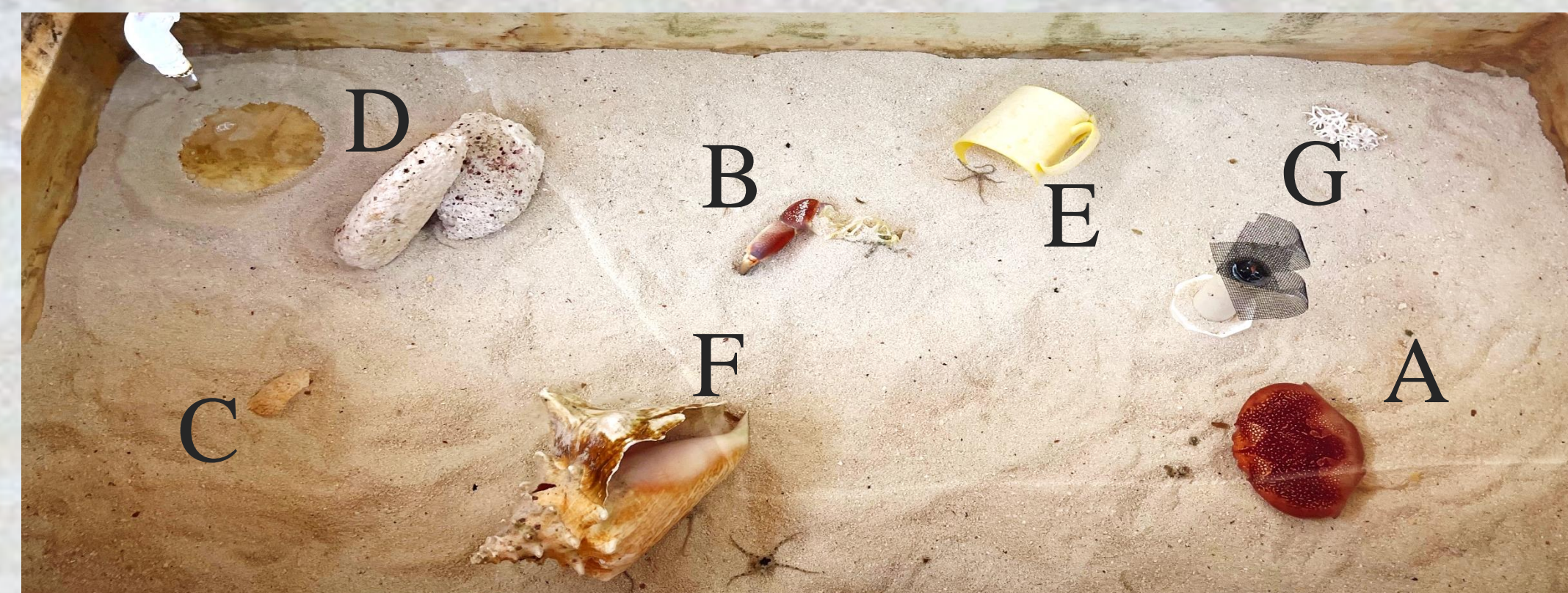


Figure 4. Location of structures on day two for data collection in wet lab of Gerace Research Center, San Salvador, Bahamas.

## Results

- We determined a significant statistical preference for brittle star structure type. A chi-square goodness of fit test was utilized ( $\chi^2=39.50$ ,  $df = 8$ ,  $p<0.001$ ).
- The most preferred structures included the broken cup (16%), side/corner of tank (19%), and the conch shell (21%) as seen in figure 5.
- The least preferred structures included the crab shell (6%), the mollusk shell (4%), and sand/ no structure (1%).



Figure 6. Study location site, Bahamas. Photo: K. Timmerman

## Conclusion

- Our hypothesis that brittle stars would have no preference for the structures in which they chose to occupy during the day was rejected. ( $\chi^2=39.50$ ,  $df = 8$ ,  $p<0.001$ ).
- Data analysis suggests that brittle stars are preferentially selecting hiding structures with the most populated structures being the conch shell, sides/corners of the tank, and the broken cup.
- Because the p-value was below 0.001 in the chi-square test, the null hypothesis of no preference in hiding structure was rejected, and it was determined that there was a preference of hiding structure.
- The small percentage of brittle stars found within the sand/no structure shows that brittle stars prefer to have some type of structure compared to nothing at all.
- Understanding why brittle stars choose certain structures will aid in the conservation of their preferred structures and in turn aid in the protection of brittle stars.

## Percent Occupancy of Structures by Brittle Stars (*Ophiordermatidae*)

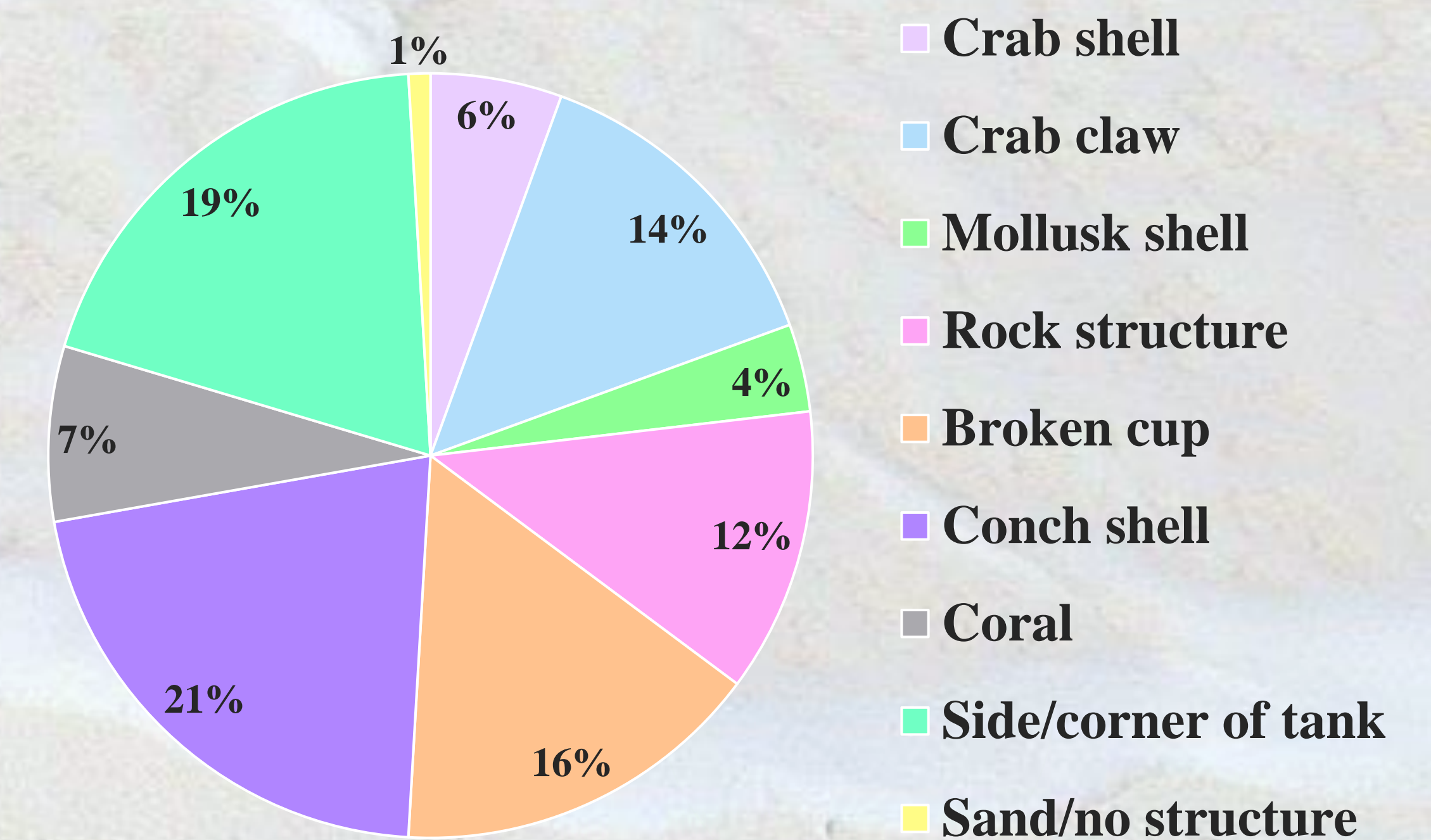


Figure 5. Occupancy of each structure over two days by banded brittle stars (*Ophiolepis apressa*) and reticulated brittle stars (*Ophionereis reticulata*). Data was obtained at the Gerace Research Center on the island of San Salvador, Bahamas.

References available upon request