



# Patterns of abundance and diversity of sponges and octocorals along a depth gradient in Mona Island, Puerto Rico



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## Introduction:

Sponges and octocorals are among the most important and diverse components of the Caribbean coral reefs. However, little is known about its distribution, abundance, and community composition in the Natural Reserve of Mona Island, an oceanic island west off Puerto Rico. This represent an important limitation in the general understanding of Mona's coral reefs ecosystem. The aim of this study was to provided baseline information in the sponges and octocorals community assemblages. More specifically, this study was intended to determine the relationship between sponges and octocorals community structure in relation to depth; assessing the abundance and diversity of both groups.

## Results:

Kendall's Concordance analysis indicates that there is a significant relationship between sponge's abundance and depth, increasing along depth gradient, having perfect concordance ( $W=1, P<0.05$ ) in the studied sites. In contrast, this pattern was not observed for octocorals ( $W=0.11, p>0.05$ ). Abundance of octocorals increased along depth in PtaC and PC. In the other hand, CS showed more abundance in shallow depth. The abundance for sponges and octocorals in equivalent depths among the study sites where compared and showed no significant patterns neither for sponges ( $W=0.011, p>0.05$ ), or octocorals ( $W=0.33, p>0.05$ ).

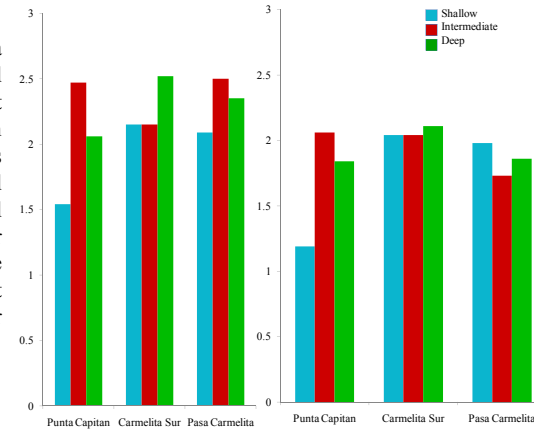


Figure 5-6: Bar graph showing Shannon's diversity index of sponges and octocorals at different study sites among depth gradient



Figure 1: Study sites in Mona Island, Puerto Rico

Legend: 1= Punta Capitan (PtA)  
2= Carmelita Sur (CS)  
3= Pasa Carmelita (PC)

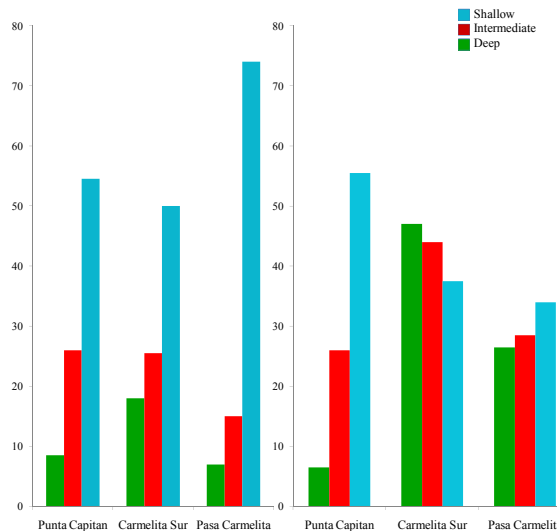


Figure 2-3: Bar graph showing a spatial comparison of sponges and octocorals abundance at study sites among depth gradient

The sponges diversity showed no significant pattern: it was higher at PtaC, increasing from shallow ( $H=1.54, J=0.7$ ) to intermediate ( $H=2.47, J=0.8$ ), and decreasing again in the deep zone ( $H=2.06, J=0.84$ ). In PC the diversity showed a similar pattern: higher at intermediate ( $H=2.5, J=0.79$ ) and lower at deep ( $H=2.35, J=0.81$ ). Similarly, the diversity of octocorals showed no pattern: in PtaC was higher at intermediate ( $H=2.06, J=0.83$ ) followed by deep ( $H=1.84, J=0.77$ ). In CS, diversity was higher in deep zone ( $H=2.11, J=0.85$ ). However, in PC diversity was higher in shallow ( $H=1.98, J=0.83$ ) zone.

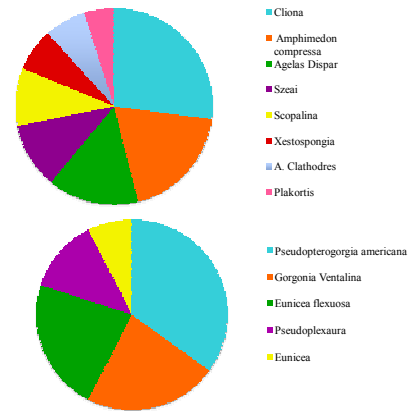


Figure 7-8: Percentage of the most abundant species of sponges and octocorals at study sites

## Methods:

The study was carried out on three reefs in Mona Island, Puerto Rico: Punta Capitan (PtA), Carmelita Sur (CS), and Pasa Carmelitas (PC). At each site sponges and octocorals densities were assessed by randomly placing four 20m<sup>2</sup> belt transect along depth gradient: shallow (5m), intermediate (8m), and deep (12m).

## Statistical Methods:

The relationship between abundance and depth was analyzed with Kendall Concordance Analysis, whereas the biodiversity were assessed with Shannons and Pielou methods.

## Discussion:

Results indicates that the abundance of sponges is significantly related to depth gradient and the different variables that might affect them. In the shallow zone their might be some factor affecting sponges abundance (i.e. water movement, sun light, sedimentation and human activity). In contrast, octocorals abundance didn't showed a pattern in relation to depth. When comparing the sponges and octocorals at equivalent depth neither one showed significant pattern of abundance. The diversity of sponges and octocorals in the study sites didn't showed a substantial pattern. There is no association between the densities, diversity and distribution of sponges, and the abundance of octocorals communities in the study sites.



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