Benthic communities of Musandam Peninsula

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ABSTRACT

The Musandam peninsula, in the Strait of Hormuz, may form an important biogeographic pathway between the Arabian Gulf and the Gulf of Oman, but also may result in the filtering of species coming from the Indian Ocean. In order to understand the role of Musandam in structuring Arabian Gulf coral reefs, we review and discuss the structure and composition of Musandam coral reefs based on obtained results collected using photo quadrat data. We then compare Musandam communities with published information on the benthic community structure apparent in the Gulf of Oman and Arabian Gulf.

INTRODUCTION

The Arabian Gulf and the Gulf of Oman, although biogeographically connected, have very different environmental conditions that have resulted in broad dissimilarities between the structure and composition of coral reef communities between regions. The majority of these differences result in reductions in the diversity of marine communities in the Arabian Gulf, which holds a depauperate subset of the Indian Ocean fauna (Carpenter et al. 1997; Feary et al. 2010). Determining the coral and substrate coverage of Musandam reefs is the first step in understanding the role of the Musandam in structuring the reef communities within the Arabian Gulf.

MATERIALS and METHODS

- Surveys were conducted at three sites in Musandam during September 2011;
- Benthic community diversity and percentage coverage were assessed visually through SCUBA using 0.25 m^2 photo quadrats taken at 3 m intervals along 6 replicate 30 m line transects at each site, with a total of 66 photo-quadrats collected per site;
- Photographs were analysed using CPCe software. Benthos at each site were identified to the lowest possible taxa and their percent cover estimated under 50 random points overlaid on each photoquadrat.

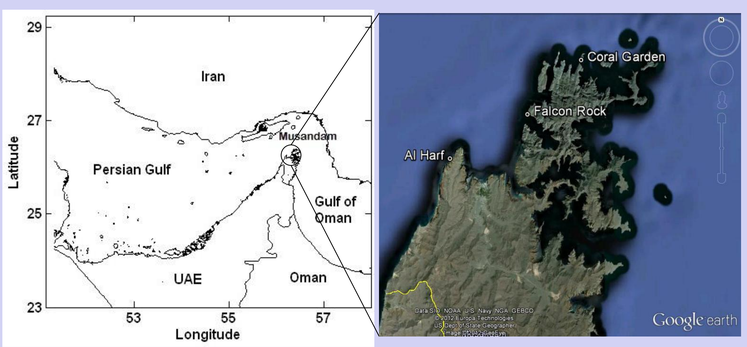

Figure 1. Location of Musandam field sites

RESULTS

- Live coral cover average of 69.7 %, raging from 47.8% to 81.8%;
- Turf algae occupies an average 3.5%, ranging from 0.3% to 7.1% (Fig. 2);

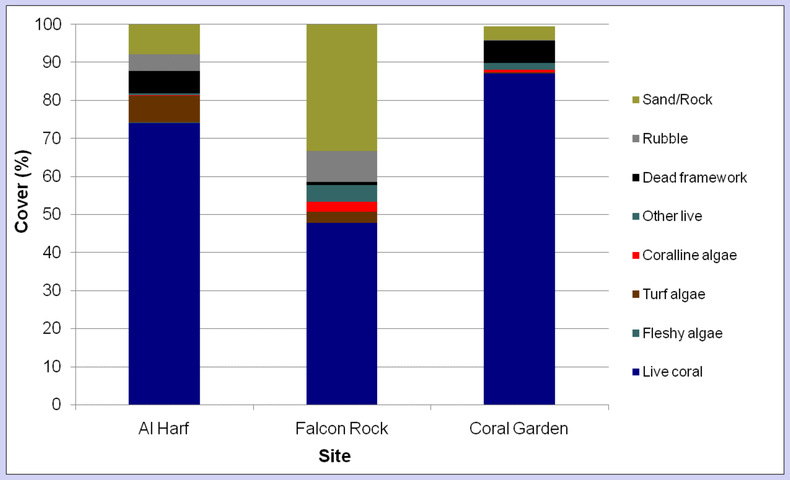

Figure 2. Benthic composition of three sites in the Musandam Peninsula

- Acroporidae dominated at Falcon Rock and Coral Garden, although Poritidae dominated in Al Harf, with an average cover of 45.8%. On the other hand Poritidae covers only 0.9% on Falcon Rock (Fig. 3);

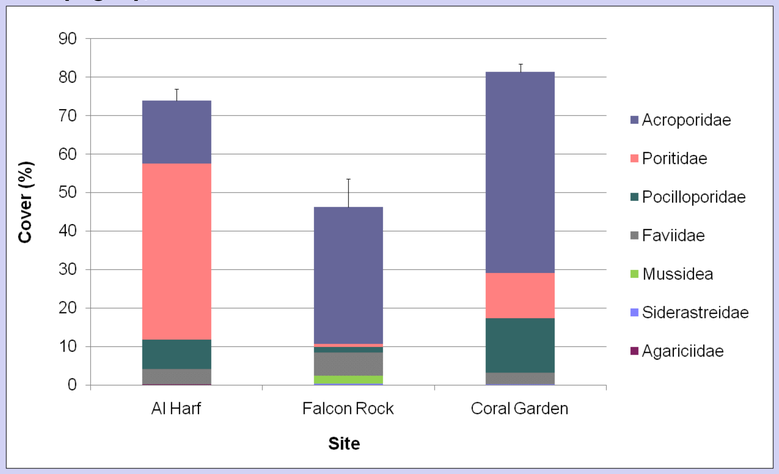

Figure 3. Coral composition of three sites in the Musandam Peninsula.

- Species richness was higher at Falcon Rock although coral cover was lower (Fig. 4).

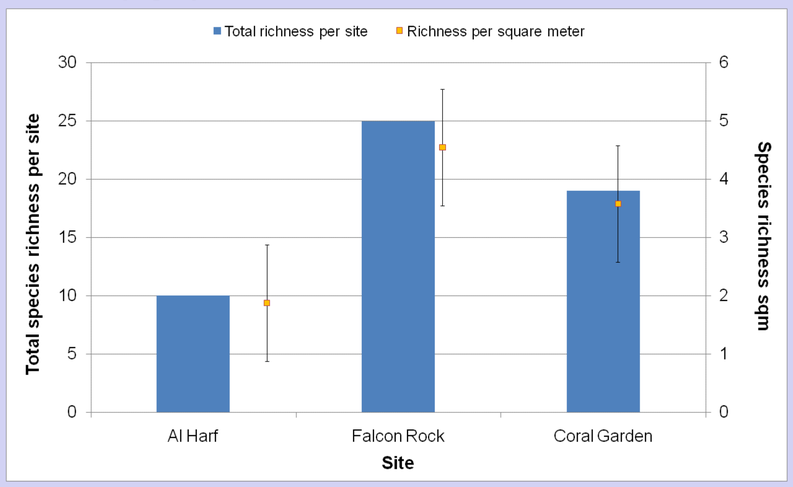

Figure 4. Species richness of three sites in the Musandam Peninsula

CONCLUSIONS

Although the Arabian Gulf is a harsh environment, the coral reefs of this area are able to survive in what are considered extreme conditions in other regions of the globe and live coral is still the most common benthic community found in some areas, as it was observed in Musandam. From this study it was also notice:

- Higher average coral cover in the Musandam Peninsula (69.7%) when compared with other studies done in Abu Dhabi (40.1%), Dibba (52.5%) and the South-East Musandam (32.5%) (Bauman et al. 2010; Burt et al. 2011);
- High mean cover value of Acroporidae corals of 34.8% when compared with the less than 1% Acropora abundance observed in Abu Dhabi (Burt et al. 2011) and the radically reduction observed in Dibba (Gulf of Oman) after the Harmful Algal Bloom observed in 2008/9 (Bauman et al. 2010);
- Species richness observed in Musandam, mean value of 18 species per transect, higher than what has been observed in previous studies in Abu Dhabi, where mean species richness per transect was 3.2 and 10.3 on East and West Abu Dhabi respectively (Burt et al. 2011).

The general higher values of live coral cover, some families abundance and species richness shown in this study suggest that this area might have an important role for the reef communities within the Arabian Gulf and Gulf of Oman. Surveys in the Musandam Peninsula will be continued for a total period of two years in order to compare seasons and also have a more detailed data of coral cover and composition changes.

References

Bauman A.G., Burt J.A., Feary D.A., Marquis E., Usseglio P. (2010) Tropical harmful algal blooms: An emerging threat to coral reef communities? Marine Pollution Bulletin 60:2117-2122.

Burt J., Al-Harthi S., Al-Cibahy A. (2011) Long-term impacts of coral bleaching events on the world's warmest reefs. Marine Environmental Research 72:225-229.

Carpenter KE, Krupp F, Jones DA, Zajonz U (1997) The living marine resources of Kuwait, Eastern Saudi Arabia, Bahrain, Qatar, and the United Arab Emirates. FAO, Rome.

Feary DA, Burt JA, Bauman AG, Usseglio P, Sale PF, Cavalcante GH (2010) Fish communities on the world's warmest reefs: what can they tell us about the effects of climate change in the future? Journal of Fish Biology 77:1931-1947.

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