DIFFERENTIAL ALGAE ASSIMILATION BY THE SEA URCHIN *Diadema antillarum* ON GRAN CANARIA ISLAND (CANARY ISLANDS) USING STABLE ISOTOPES

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INTRODUCTION

Currently overpopulation of the sea urchin *Diadema antillarum* is causing negative effects on the Canary rocky bottoms. This phenomenon produces an urchin-barrens landscape called locally "blanquizal", mainly constituted of a white substratum with a high density population of sea urchins and just a few species of porifera, briozoa and algae (Aguilera *et al.*, 1994; Garrido, 2003; Lessios *et al.*, 2001; Tuya *et al.*, 2001, 2006; Clemente *et al.*, 2007; Hernández *et. al.*, 2008).

Studies on feeding ecology of *D. antillarum* on Canary Island shallow subtidal ecosystems have been developed through field observations and gut contents analysis. These kind of approaches show evidence on the feasible composition of the sea urchin diet, but not display a true contribution of algal species in the sea urchin tissues.

In contrast to field observations, stable isotope approaches on dietary reconstructions relies on intrinsic tissue signatures to provide information on trophic level and the relevance of different prey items in the diet (Hobson and Sease, 1998).

The aim of this work is to distinguish what are the components that were really being assimilated by *D. antillarum* on Gran Canaria bottoms using mixing models and stable isotopic signals of C and N.

MATERIAL AND METHODS

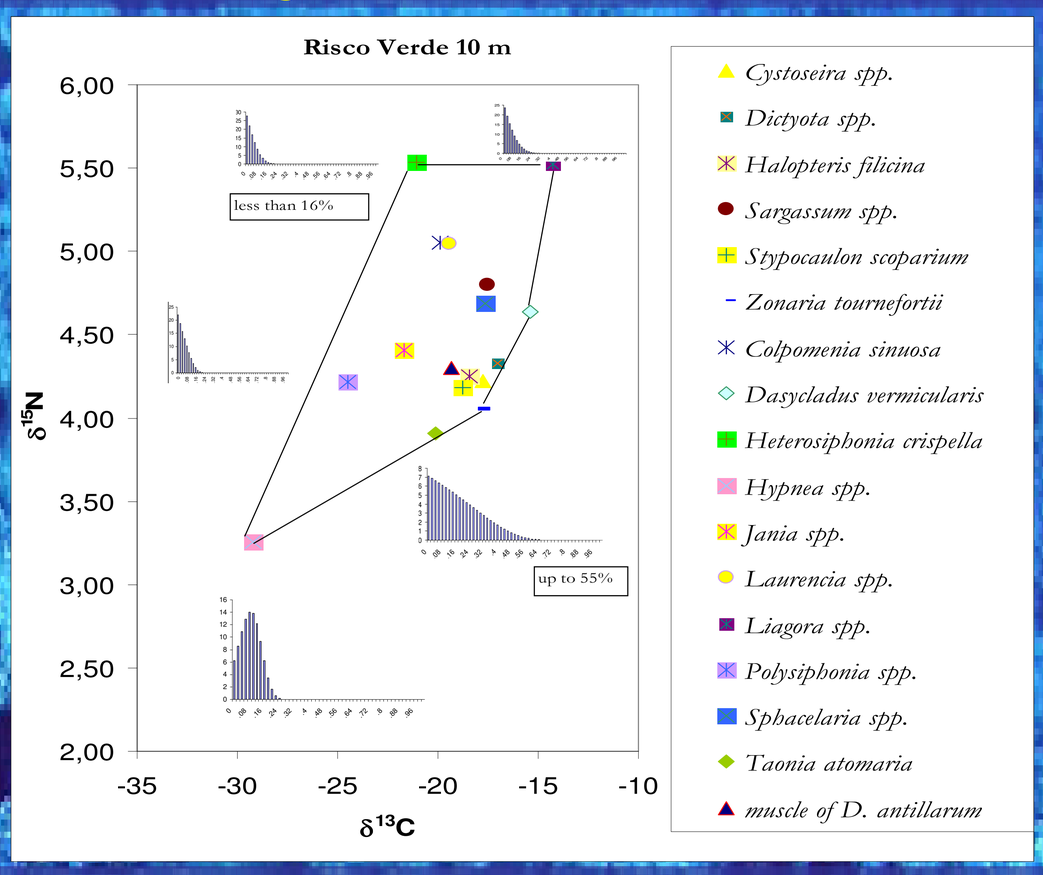
In this work we analyzed the availability of nutritional resources in 2 different places on Gran Canaria Island (urchin barrens in different stages of maturation -mature and immature-) in order to identify which were the potential food sources and which of those were assimilated by the sea urchin. We refer the term mature to distinguish spaces with a high abundance of sea-urchin and poor algal cover (La Catedral), and as immature, places which have algal cover moreover sea urchins (Risco Verde).

Diet of *D. antillarum* was evaluated through mixing models approach based on mass balance equations according to Phillips (2001). We use the proportional contribution of different $\delta^{13}C$ and $\delta^{15}N$ sources (algae) and C and N signatures of muscle from two urchin-barrens.

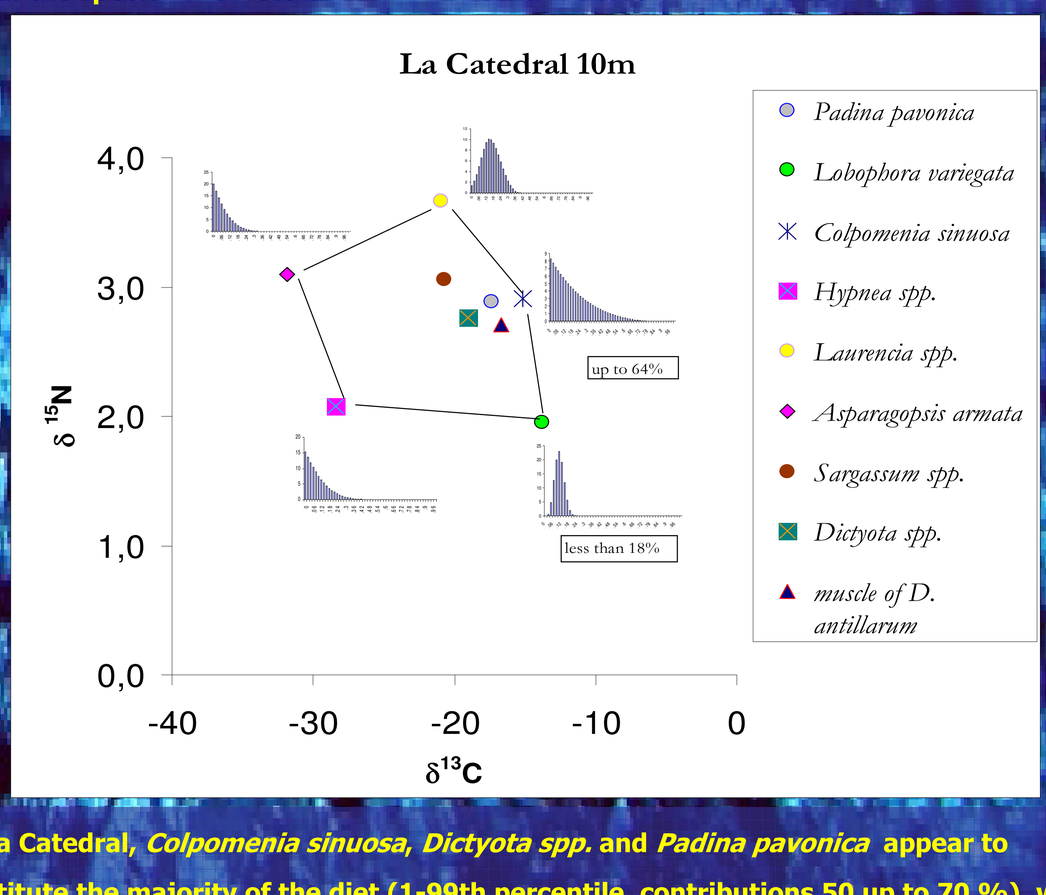
RESULTS

Our results are showing a dietary reconstruction of *D. antillarum* relies on muscles stable isotopes signatures, which provide information about different algae species of sea urchin diet.

Mixing models are an useful tool to understanding the trophic ecology of *D. antillarum* and other organisms.



On Risco Verde, *Taonia atomaria*, *Zonaria tournefortii*, *Halopteris filicina* and *Stypocaulon scoparium*, constitute the most important algae contributions (40-55%) followed by species as *Sargassum spp.*, *Sphacelaria spp.*, *Dictyota spp.* and *Dasycladus vermicularis* (30-40%) appear as important secondary resources in immature urchin barrens, and the rest of the species with less than 24% of contribution.



On La Catedral, *Colpomenia sinuosa*, *Dictyota spp.* and *Padina pavonica* appear to constitute the majority of the diet (1-99th percentile, contributions 50 up to 70 %), with *Laurencia spp.*, *Hypnea spp.* and *Sargassum spp.* an important secondary food source (30-45%) and the other sources (*Asparagopsis armata* and *Lobophora variegata*) representing the remainder of the diet.

CONCLUSIONS

- Our results showed that *D. antillarum* has different diet composition of species and it's diet is constituted by differential sources proportion depending on stage of urchin-barren maturation.
- There are not a particular dietary preference by *D. antillarum* neither to specific algae group nor morphological features.
- *Colpomenia sinuosa*, *Dictyota spp.* and *Padina pavonica* appear to be important components of the diet where urchin barrens are mature.
- Species as *Taonia atomaria*, *Zonaria tournefortii*, *Halopteris filicina* and *Stypocaulon scoparium* constitute important resources in immature urchin barrens and showed a higher degree of sources overlapping than the other sites surveyed.

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