Título: IN SITU DIRECT STUDY OF FILTRATION AND RESPIRATION RATE OF MEDITERRANEAN SPONGES.

Nombre: MORGANTI, TERESA MARIA

Universidad: Universidad Politécnica de Catalunya

Departamento: Enginyeria civil i ambiental

Fecha de lectura: 27/07/2016

Programa de doctorado: Programa Oficial de Doctorado en Ciencias del Mar

Dirección:

- **Director:** RAFEL COMA BAU
- **Codirector:** MARTA RIBES LLORDES
- **Tutor/Ponente:** JOSÉ ANTONIO JIMÉNEZ QUINTANA

Tribunal:

- **presidente:** MARIA JESÚS URIZ
- **secretario:** Cruz Palacin Cabañas
- **vocal:** JOSEP MARIA GILI SARDA

Descriptores:

- ECOLOGIA ANIMAL
- FISIOLOGIA ANIMAL
- INVERTEBRADOS
- ZOOLOGIA MARINA

El fichero de tesis no ha sido incorporado al sistema.

Resumen: Sponges play important roles in the functioning of marine ecosystem in which they are abundant. These roles range from stabilizers of substrate, to acting as major link between benthic and pelagic realms by filtering large quantities of water and retaining the particles with high efficiency. Despite sponges have been the focus of much interest in the past years our knowledge on sponge physiology is still poorly understood. This study focused on ecophysiology of five of the most prominent sponge species dwelling the coralligenous community in the NW Mediterranean Sea, and employed an energetic approach to understanding the complex interactions between physiological constrains and seasonal fluctuations of environmental factors experienced by the organism under natural conditions. In this thesis, we contributed to the still limited knowledge of energetic mechanisms that regulate seasonal dynamics and elucidated divergent metabolic profiles between high microbial (HMA) and low microbial (LMA) abundance species accordingly to their different adaptive life strategies. For this purpose we examined the in situ feeding, filtering and respiration activity over annual cycle. Firstly, we started by developing a system for quantifying the particulate and dissolved compounds processed by sponges under natural conditions. In terms of feeding, we observed that all species retained plankton at high efficiency and DOC was the main source of carbon. However, the nitrogen fluxes showed a marked different trophic niche between the two groups: HMA species mostly relied on dissolved compound as main source of N, while LMA solely relied on particulate fractions. Interestingly, natural variation of sponge pump did not follow natural temperature changes. During the period of maximum temperature the sponge pump did not reach its maximum values, suggesting that intrinsic mechanism as a decrease in choanocytes during reproductive cycle may regulate this metabolic process. On the other hand respiration clearly showed a seasonal pattern following natural temperature fluctuation. Combined, these results allowed us to estimate the overall energy budget, which appeared to be regulated by an increase of energy demand in summer as well as the availability of dissolved organic carbon fraction in the water column. Our result also showed different limited energetic profiles between HMA and LMA species accordingly to their different feeding strategies. LMA species appeared to procure sufficient energy to meet metabolic requirements for maintenance and growth by filtering suspended particulates, and dissolved fraction represented an additional input of carbon when available. On the contrary the heterotrophic nutrition in the natural environment may be insufficient to meet basal metabolic requirements in HMA species, suggesting other metabolic pathways as relevant for the energy budget of these species.