

Contrasting growth and survival of two cryptic sponge species sharing habitats in western Mediterranean

L. Garate, A. Blanquer, Maria J. Uriz

Centre d'Estudis Avançats de Blanes. Acces Cala St Francesc, 14. 17300 Blanes (Girona) Spain

Keywords: sponges, cryptic species, Mediterranean Sea, survival, growth dynamics

Introduction

Sponges are important elements in marine benthos assemblages as they play essential roles in ecological processes such as niche supply, competition for resources, and matter recycling (Diaz & Rützler 2001; de Goeij et al. 2013) among others. Inter-species variation in growth dynamics has two main components: one species-specific, genetically triggered, and the other related to environmental conditions such as nutrient availability or temperature regimens (De Caralt et al. 2008). However, intra-population differences in growth would be attributed to local phenotypic/genotypic adaptation to particular environmental factors. *Hemimycale columella* is a widespread Atlanto-Mediterranean species, which seemed to show contrasting life span depending on the population considered. Yet, recently, it has been concluded that what were considered populations of *H. columella* indeed belonged to two different, morphologically cryptic species (Uriz et al. this symposium). In this study we aim to monitor survival, growth, and dynamics of two *Hemimycale* cryptic species in two close localities of the Northwestern Iberian Mediterranean and to characterize the main environmental factors of their respective habitats.

Methods

Two populations of what were thought to be *H. columella* (now *H. columella* and one of *H. mediterranea*, Uriz et al., this symposium) were photographically monitored for 25 months and 8 months respectively. Water samples were taken in the vicinity of individuals the same day of monitoring for nutrient analyses, and temperature was recorded with a Temperature Data Logger placed in each

location. MANOVA and cross-correlations analyses were performed to compare growth and dynamism of the sponge species populations and to determine environmental implication on them.

Results

Survival curves significantly differed between the two species. The population of *H. mediterranea* sp. nv. (Uriz et al., this symposium) experienced mass death at the end of the reproductive period and thus had a life span of ca. eight months, while 64% of the *H. columella* population survived after the two monitoring years. Growth rates significantly differed between the two species. *H. mediterranea* had the highest growth rates in summer, before population demise at the end of September, while *H. columella* had the highest growth rates in cold months. Also species dynamism was significantly different between species, since *H. mediterranea* underwent fusions and fissions along its whole life span, while *H. columella* concentrated the majority fusion and fission events at the beginning of the cold months.

Some environmental factors differed significantly between localities during the monitoring period but cross-correlations between species growth rates and the environmental variables analyzed showed only negative correlation with T and DON of *H. columella* growth rates.

Discussion

It has been reported here the contrasting life span of two sibling contrasting sponge species. As it happened in other study with Mediterranean cryptic sponges (Blanquer et al. 2008), here the sibling *Hemimycale* species present contrasting behaviors for growth and dynamism, and their relationships with environmental factors. *H. mediterranea* has an annual life span, as the whole population disappeared after larval release, independently of the water trophic conditions, while *H. columella* population has a multiannual life span, although may experience summer aestivation due to insufficient available nutrients, but reaches the highest growth rates in cold months after thermocline breakage.

Blanquer A, Uriz MJ, Agell G (2008) Hidden diversity in sympatric sponges: adjusting life-history dynamics to share substrate. *Mar Ecol Prog Ser* 371:109-115.

De Caralt S, Uriz MJ, Wijffels RH (2008) Grazing, differential size-class dynamics and survival of the Mediterranean sponge *Corticium candelabrum*. *Mar Ecol Prog Ser* 360:97–106.

de Goeij JM, van Oevelen D, Vermeij MJ, Osinga R, Middelburg JJ, de Goeij AF, Admiraal W (2013) Surviving in a marine desert: the sponge loop retains resources within coral reefs. *Science* 342:108-110.

Diaz MC, Rützler K (2001) Sponges: an essential component of Caribbean coral reefs. *Bull Mar Sci* 69:535–546.

Uriz MJ, Garate L, Agell G (2016) The meandering path to the discovering of sponge cryptic species. XIX Iberian Symposium on Marine Biology Studies (SIEBM XIX), Porto (Portugal), 5th - 9th September 2016.

Acknowledgements

This study has been funded by project MarSymbiOmics (MINECO, I+D+I of Excellence, CTM2013-43287-P)