

BATH SPONGES FROM A MARINE PROTECTED AREA IN THE AEGEAN SEA

E. Voultsiadou^{1*}, C. Antoniadou¹, T. Dailianis¹, D. Vafidis² and C. Dounas³

¹ Department of Zoology, School of Biology, Aristotle University, Thessaloniki, Greece - elvouts@bio.auth.gr

² Department of Ichthyology and Aquatic Environment, University of Thessaly, Nea Ionia, Magnesia, Greece

³ Institute of Marine Biology & Genetics, Hellenic Centre for Marine Research, Heraklion, Crete, Greece

Abstract

Diversity and density of bath sponges have been investigated in eleven localities inside and outside the area of the National Marine Park of Alonissos and Northern Sporades (NMPANS). The species *Hippospongia communis* (Lamarck, 1814) and *Spongia officinalis* (Linnaeus, 1759) were recorded. Dense populations of the latter, consisting of moderate-sized individuals, were detected exclusively in the core of the Marine Protected Area (MPA). Considering the dramatic decline of Mediterranean commercial sponge populations during the last 20 years, due to the combined effects of successive disease outbreaks and unregulated fishing activities, the remarkable sponge abundance recorded suggests that protection conditions may be considerably in favour of the viability of sponge populations.

Keywords: *Porifera, Sporades Islands, Marine Parks, Density, Conservation*

Introduction

Five sponge species of the family Spongiidae have been traditionally harvested in the Mediterranean Sea ([1]). During the last decades periodic disease outbreaks have decimated their natural populations ([2]) and along with unregulated harvesting have caused a severe decline in bath sponges catch. In Greece, a large area of the north Aegean, covering 2.220 km², has been assigned as a Marine Park since 1992, constituting the largest MPA in the Mediterranean Sea ([3]). Before the imposition of the protective measures, the area was regularly exploited by sponge fishermen, while afterwards only sporadic, unauthorized harvesting of bath sponges occurred, mostly outside the core of protection.

Materials and Methods

The study was conducted in summer 2008, at 7 stations set inside the established Marine Park and 4 stations in adjacent unprotected areas (Figure 1). Sponge population density was estimated by scientists accompanied by sponge fishermen diving down to 50 m, as the number of individuals encountered per length of investigated area (N/km). In total 130 randomly selected sponge individuals were measured for their dimensions in three axes and their product was used to estimate sponge size in liters.

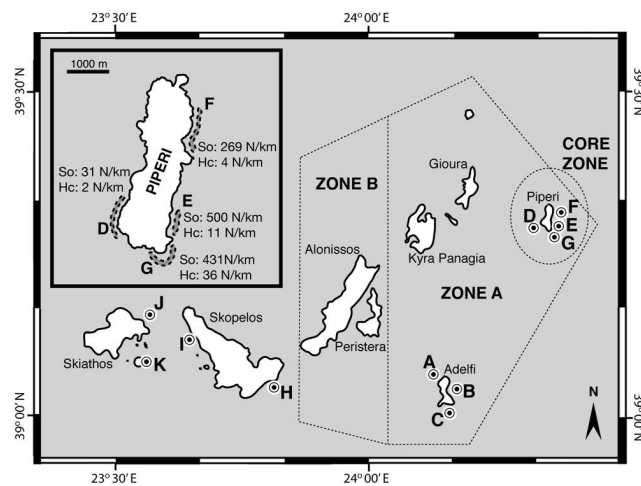


Fig. 1. Study area indicating sampling stations and estimated population density of sponge species (So: *S. officinalis*, Hc: *H. communis*)

Results and Discussion

The two most common Mediterranean bath sponge species, *H. communis* and *S. officinalis*, were recorded exclusively inside the core area of the Marine Park on rocky bottoms and *Posidonia* meadows; the former in low abundances, and the latter with dense populations at most occasions (Figure 1). *S. officinalis* varied in size from 0.27 to 7.2 liters, and its population consisted mostly of moderate-sized individuals. The size of *H. communis* individuals varied from 1.6 to 21.2 liters, exhibiting a wider range of size distribution due to the presence of few large-sized individuals (Figure 2).

Although preliminary, the present data suggest that protection measures may be considerably in favour of the viability of sponge populations which thrive inside the MPA, in contradiction with the unprotected areas surveyed in this study as well as other Aegean areas open to uncontrolled sponge fishery ([4]). In other Mediterranean areas over-exploitation and disease incidences have also led to a decreasing trend in sponge abundance and size ([1]), while recovery was observed in MPAs ([5]). However, the low population density values in one studied station of the core area and the complete absence of the two species from other stations in protection zone A suggest that the protection scheme *per se* cannot safeguard the existence and robustness of commercial sponge populations. The systematic comparison of sponge communities between protected and unregulated areas, as well as the investigation of the particular environmental conditions in the North Sporades Archipelago will further elucidate the reasons of these findings.

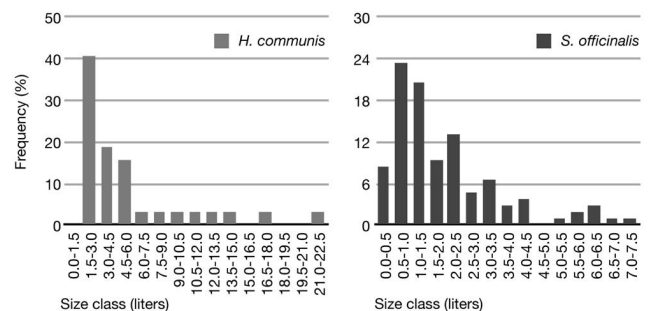


Fig. 2. Size frequency distribution of the studied populations of sponge species

Acknowledgments : This research was supported by the Greek Ministry of Rural Development and Food (EPAL 2006-2008). We are grateful to the Management Body of the NMPANS, as well as to the crew of the sponge fishing vessel "Cap. Giorgos" for their help.

References

- 1 - Pronzato R. and Manconi R., 2008. Mediterranean commercial sponges: over 5000 years of natural history and cultural heritage. *Mar. Ecol.*, 29: 146-166.
- 2 - Webster N.S., 2007. Sponge disease: a global threat? *Environ. Microbiology*, 9(6): 1363-1375.
- 3 - Badalamenti F., Ramos A.A., Voultsiadou E., Sanchez Lizaso J.L., D'Anna G., Pipitone C., Mas J., Ruiz Fernandez J.A., Whitmarsh D. and Riggio S., 2000. Cultural and socio-economic impacts of Mediterranean marine protected areas. *Environ. Conserv.*, 27: 110-125.
- 4 - Voultsiadou E., Antoniadou C., and Vafidis D. 2008. Sponges of economical interest in the Eastern Mediterranean: an assessment of diversity and population density. *J. Nat. Hist.*, 42: 529-543.
- 5 - Perez T. and Capo S., 2001. Eponges commerciales du Parc National de Port-Cros : estimation de la densité de deux populations de *Spongia officinalis* (Linne, 1759). *Sci. Rep. Port-Cros natl. Park, Fr.*, 18: 143-148.