

DISTRIBUTION OF THE SEA PENS *Virgularia mirabilis* AND *Funiculina quadrangularis* (CNIDARIA ANTHOZOA) IN THE NORTHERN AND CENTRAL ADRIATIC SEA

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Abstract

Occurrence and distribution of the sea pens *Virgularia mirabilis* and *Funiculina quadrangularis* in the northern and central Adriatic Sea were determined from data collected during five trawl surveys from 2011 to 2015 carried out through *rapido* trawl. Species density data (number of individuals per km²) were processed to describe their spatial distribution.

Keywords: *Cnidaria*, *Conservation*, *North Adriatic Sea*

Introduction

Virgularia mirabilis (Müller, 1776) and *Funiculina quadrangularis* (Pallas, 1766) are two sea pens species that, with *Pennatulina phosphorea* Linnaeus, 1758, characterize the "Sea pen and burrowing megafauna communities" habitat. This biotope complex was classified by OSPAR as a 'Threatened and/or Declining Habitat' [1]. Recently, these species were also included in the IUCN red list of Italian corals [2]: *V. mirabilis* as vulnerable species while *F. quadrangularis* as critically endangered species. For these reasons, a better knowledge of the distribution of these sea pens is of key conservation importance.

6500.3 (2015) ind km⁻², while *F. quadrangularis* density ranged from 54.7 (2014) to 7771.6 (2014) ind km⁻². Both species occurred on muddy or muddy-sand sediments: *V. mirabilis* was confined to shallow waters along the Italian coast (<50 m depth), while *F. quadrangularis* mainly occurred in deeper waters in the central Adriatic Sea (>40 m depth) (Fig. 1).

Discussion and Conclusions

The spatial distribution of *V. mirabilis* and *F. quadrangularis* in the northern and central Adriatic Sea revealed that both species mainly inhabit sediments with high mud content, although they have been also recorded in sandy bottoms. In particular, the occurrence of *V. mirabilis* in shallow waters may be related to the inflow of the Po River plume, which mainly affects the Italian coast and partially off the Venice Lagoon, where it spreads over the region developing cyclonic and anticyclonic subregional gyres [5]. On the contrary, *F. quadrangularis* distribution is almost limited to deeper waters characterized by low hydrodynamism. These findings agree with what already reported by Grethae *et al.* [4], who found that sea pen distribution is strongly related to mud contents, but also to other environmental variables, such as depth, current speed, salinity and nutrient concentration. Further studies are needed to establish the correlation between the distribution of these threatened sea pens in respect to their adaptability to different environmental conditions. Considering that *rapido* trawls have a low catchability for these anthozoans [4], data collected by means of other sampling methods (e.g., diving or video surveys) would be needed to get more accurate estimations of abundance of the two species and to find the better solution for sea pens conservation strategy.

References

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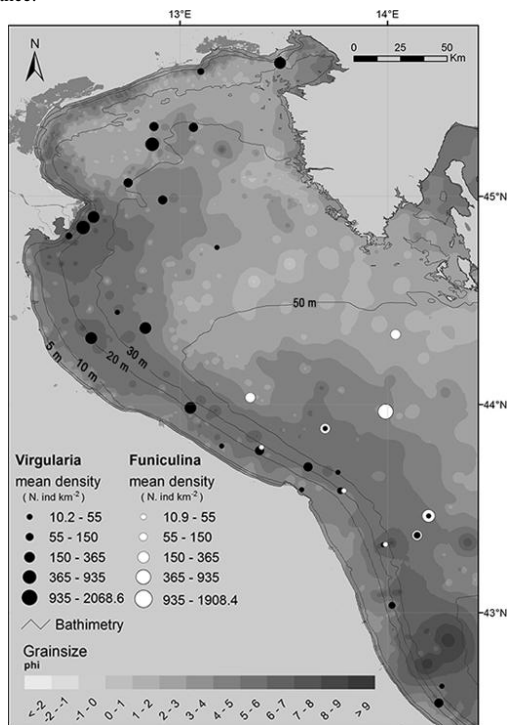


Fig. 1. Mean density (N. ind km⁻²) of *Virgularia mirabilis* (black dots) and *Funiculina quadrangularis* (white dots) in the Adriatic Sea estimated over the five survey years.

Material and Methods

Specimens of *V. mirabilis* and *F. quadrangularis* were collected in the northern and central Adriatic Sea during SoleMon trawl surveys carried out in fall from 2011 to 2015, using *rapido* trawls [3]. Specimens were identified and counted. Data were standardized to km² and used to draw the distribution map.

Results

V. mirabilis density ranged from a minimum of 27.4 (2012) to a maximum of