

BENTHIC FLORA AND FAUNA IN A SUBMARINE CAVE IN THE CENTRAL ADRIATIC SEA

Grubelic Ivana, Antolic Boris*, Span Ante

Institute of Oceanography and Fisheries, 21000 Split, I.Mestrovica 63, Croatia

Abstract

Benthic flora and fauna and its structure and distribution in a submarine cave were studied as a part of biological and ecological studies of Rogoznica area (middle Adriatic). Samplings were performed around the entrance to the cave, at the entrance itself and inside the cave. SCUBA divers collected the samples from hard and mobile substrates between 2 and 28 m depth. A total of 185 benthic species (106 taxa of benthic flora and 79 taxa of benthic fauna) were identified.

Keywords: *phytobenthos, zoobenthos, Adriatic Sea*

Introduction

The eastern Adriatic coast is mainly built of jurassic limestones and is therefore rich in karst relief such as submarine and above sea steeps, caves, holes and others due to abrasion by rainfall, waves and other atmospheric effects.

The level of the Adriatic Sea have changed on several occasions through its long geological history, which also has affected the geomorphology of its bottom and coast, as well as its ecological conditions and biota; the cave described in this paper, with its limestone forms such as stalactites, which could have been formed only in the land caves, supports this theory.

It is generally known, as shown by the studies and descriptions of different submarine cave types, that, as to the light conditions, they can be semi-dark or completely dark. Therefore the biocoenoses which develop in the caves are divided into the biocoenoses of semi-dark and biocoenoses of dark caves, where the animal component prevails over the plant component (1- 6).

Materials and methods

The study was carried out in July 1993 in the cave situated in the utmost, closed and shallow part of the Soline Cove (Rogoznica: 43°32' N, 15°57' E). The research covered the rocky and sediment bottom around the entrance to the cave (I; Fig. 1), the narrow eroded part of the cave entrance (II), the vertical parts of the siphonal entrance to the cave (III), the inner semi-dark part of the cave down to 15 m depth (IV), the inner completely dark part of the cave down to 28 m depth (V) and the sediment of the sea bottom in the cave between 18 and 28 m depth (VI).

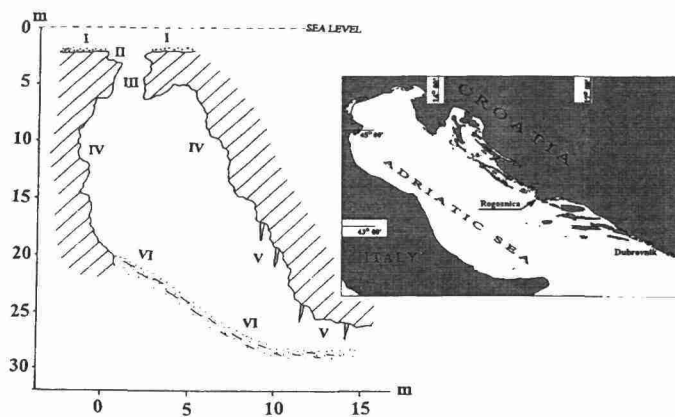


Fig. 1. Schematic representation of the cave complex.

The samples from hard and mobile bottoms were collected by SCUBA divers. Benthic flora and fauna (qualitative composition and distribution) was expressed by numerical and percentage relations between systematic compartments of benthic algae (Rhodophyta, Phaeophyta and Chlorophyta) and marine phanerogams (Angiospermae; 7, 8).

The review of qualitative composition and distribution of benthic fauna includes the species of the following systematic groups of macrobenthic invertebrates: Porifera, Cnidaria, Echinodermata, Mollusca, Annelida, Crustacea, Bryozoa, Brachiopoda, Echinodermata and Tunicata. Numerical and percentage relationship between species of systematic compartments of flora, fauna and between flora and fauna are also given for the study area.

Results and discussion

Phytobenthos

A total of 105 taxa of benthic algae (Rhodophyta 74 or 69.8%, Chlorophyta 17 or 16.0% and Phaeophyta 14 or 13.2%) and marine phanerogam *Cymodocea nodosa* were collected and determined from the mentioned parts of the cave complex.

The number of algal taxa steadily decreased from surface (I) across the entrance (II and III) to the cave interior (IV) where only 14 taxa were recorded (Fig. 2). This was to be expected since light intensity is suddenly reduced in this direction causing substantial decrease in the number of autotrophic organisms, that is in the benthic algae.

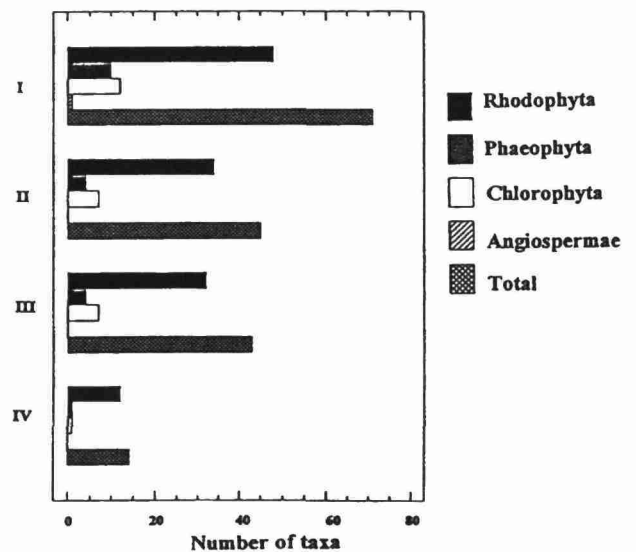


Fig. 2. Numerical presence of benthic algae and marine phanerogam in the cave complex.

Rhodophyta gradually decreased and the percentage increased from surface (I) to the cave interior (IV) where the lowest number (12) and highest percentages (85.7%) were recorded from this systematic compartment of the entire cave complex. In Chlorophyta and Phaeophyta a reduction in the number and percentages, also recorded from surface (I) towards the cave interior (IV), was more conspicuous as far as the numbers are concerned than the percentages (Fig. 2).

It should be mentioned that the benthic algae inside the cave (IV) were mainly epibiota of different sponge species.

In total 70 taxa of benthic algae were determined in the parts II, III and IV, or 66% of all determined taxa of benthic algae recorded from the cave complex. As to the composition and structure of benthic vegetation developed in the various parts of the cave complex, it should be emphasized that in the surface cave part (I) the photophilic species *Cystoseira adriatica* with a large number of epilithic (*Cystoseira schiffneri*, *Padina pavonica*, *Halopteris scoparia*, *Anadyomene stellata*, *Acetabularia acetabulum*, *Dasycladus vermicularis*) and epiphytic (*Ceramium tenuissimum*, *Spyridia filamentosa*, *Wrangelia penicillata*, *Chondria tenuissima*, *Laurencia obtusa*, *Sphacelaria cirrosa*, *Sphacelaria fusca*) species are well developed. The marine phanerogam *Cymodocea nodosa*, present in *Cystoseira* settlement in places with somewhat thicker sand sediment belongs to the same ecological supergroup. Approaching the other cave parts inhabited by algae (II,