

BIOLOGICAL AND GEOLOGICAL VALORISATION OF THE COASTAL LINE AND SUBMARINE AREA OF THE ISLANDS ČUTIN MALI I ČUTIN VELI AIMING TO ESTABLISH A PROTECTED AREA

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Abstract

Geological, sedimentological and biological investigations of the submarine zone of Čutin Veli and Čutin Mali islets (Kvarnerić, Adriatic Sea), aimed at biological and geological assessment, led to the proposal of a protected area. In the coastal area of Čutin Veli and Čutin Mali islets 8 biocoenoses were determined, 5 of which, according to the Mediterranean Action Plan, are classified as especially valuable communities with 19 floral and faunal species.

Keywords: Marine protected areas, Benthic biocoenology, Geology, Adriatic Sea

Introduction

Although the Kvarner area is relatively well investigated, the eastern, northern and western coasts of the island of Cres are practically unstudied. No published data on the biology and geology of the islets of Čutin Veli and Čutin Mali, situated in the Kvarnerić (Adriatic Sea), off the south-eastern coast of the island of Cres are available. Geological and biological researches of the Čutin islets were carried out in the periods October 16-19, 2001 and June 17-20, 2002.

Methodology

The research of benthic biocoenoses was carried out by using the method of direct observation and photodocumentation by means of SCUBA-diving equipment. On the basis of field notes and material determination we determined the benthic communities according to the classification of Pérès and Picard (1) and Bellan-Santini *et al.* (2). The methodology of crab gathering was carried out by using the technique of autonomous diving at transects up to 40 m in depth, or 100 m from the shore, and by special crab traps (3). The composition of the fish assemblage was investigated by using the visual census method. A modified method of point counts was employed (4).

Results and Discussion

The islets of Čutin Veli and Čutin Mali are part of the submerged karstic plateau extending along the eastern coast of the island of Cres. That is why the sea bottom surrounding the islands is very shallow. The eastern edge of the karstic plateau is a submerged scarp extending from the Meli cape toward south-east. Submerged scarp sinks vertically to the depth of 35 to 50m. After that, the sea bottom is slightly inclined to horizontal. In the submarine zone of the researched area there are three basic types of sea bottom: bare rocks with no sediment layer to the depth of 8.5 m, the basic rocky mass is covered with coarse sands to gravel in greater depths, and finely grained muddy sediment on the bottom exceeding 40 m in depth.

In the area of investigation 52 species of macroflora (Cyanophyta 1, Rhodophyta 26, Phaeophyta 13, Chlorophyta 12, Angiospermae 1) and 195 species of macrofauna (Sarcodina 1, Porifera 25, Cnidaria 22, Placophora 2, Gastropoda 21, Bivalvia 17, Cephalopoda 1, Echiura 1, Sipuncula 1, Polychaeta 8, Crustacea 23, Bryozoa 9, Echinodermata 12, Tunicata 5, Pisces 46) were determined. The total of 6 hardbed biocoenoses was determined: the biocoenosis of upper mediolittoral rock, biocoenosis of lower mediolittoral rock, biocoenosis of infralittoral algae, precoralligenous aspect of a coralligenous biocoenosis, coralligenous biocoenosis and biocoenosis of semi-dark caves. Furthermore, two biocoenoses of soft bottoms were determined: the biocoenosis of *Posidonia oceanica* meadows and the biocoenosis of littoral detritic bottom. Within the determined biocoenoses, relative to the domination and cover of greater areas of the bottom surface, different facies and associations are developed. The Mediterranean Action Plan (MAP), which is part of the UN program, established a list of communities, associations and facies, as well as a list of areas to be included in the national list of areas of interest for protection. In the coastal area of Čutin Veli and Čutin Mali islets 8 biocoenoses were determined, 5 of which, according to the MAP, are classified as especially valuable communities with 19 floral and faunal species. In the circalittoral step, at the depth of 40-50 m, fifty to sixty percent of the detritic bottom is covered by invasive alga

Womersleyella setacea. Greater settlements of the alga in the northern Adriatic were first described on the eastern coast of the island of Cres (5).

Qualitative research focused on decapods revealed 24 species in the Čutin seabed. The greatest part of the decapod fauna was found in the infralittoral zone, up to 10 m in depth. This is because the meadows of *Posidonia oceanica* extend at that depth, and are the ideal habitat and shelter for this group of invertebrates. *Brachycarpus biunguiculatus* was recorded, this is the first recorded from the Adriatic. Three species considered as rare in the Adriatic were also recorded: *Processa macrophthalma*, *Ilia nucleus* and *Inachus phalangium* (6). The species *Homarus gammarus* and *Maja squinado* included in the Coding list of endangered or threatened species, Annex II of the Barcelona Protocol, were also found.

A total of 46 fish species was recorded during the dives. The greatest contribution to biodiversity was given by the family Gobiidae (13 species), followed by the Labridae (8 species) and Sparidae (8 species). The frequency of occurrence per each point reveals that the hyperbenthic species *Coris julis* and *Chromis chromis*, and epibenthic gobies *Gobius xanthocephalus*, *Gobius vittatus* and *Thorogobius ephippiatus* were most frequent. The most abundant species in general is *Chromis chromis*, whereas, within the benthopelagic and hyperbenthic species, *Oblada melanura* and *Spicara smaris*, *Coris julis* and *Boops boops* were among the most numerous. Among the epibenthic species, the most numerous were the gobies *Gobius vittatus* and *Gobius xanthocephalus*.

In order to preserve the important benthic communities extending from the mediolittoral to the circalittoral zone, protection of the area of Veli and Mali Čutin islands is required due to intensive human activity in the form of fishing and diving tourism. Since the area of investigation was small, the area of the Čutin islets should be integrated with the protection of other parts of the eastern coast of Cres and of other islets in the Aquatorium.

References

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