BIODIVERSITY OF ZOOBENTHOS ASSOCIATED WITH A *CLADOCORA CAESPITOSA* BANK IN THE NORTH AEGEAN SEA

Chryssanthi Antoniadou [1]* and Chariton Chintiroglou [1]
[1] Aristotle University, School of Biology, department of zoology, Thessaloniki, 54124, Greece - antonch@bio.auth.gr

Abstract
Biodiversity of zoobenthos associated with a *Cladocora caespitosa* bank was assessed in the north Aegean Sea, during summer 1998. Overall, 31 megabenthic and 54 macrobenthic species were recorded, 58 of which are reported for the first time to live in association with *C. caespitosa*; thus, the biodiversity of *C. caespitosa* assemblages is increasing to 286 species. 12 species dominated in frequency and abundance and the estimated diversity indices gained high values. These results indicate that the associated assemblages are probably differently structured among individual colonies and banks.
Keywords: Aegean Sea, Biodiversity, Rocky Shores, Zoobenthos

Introduction
Cladocora caespitosa (Linnaeus, 1767) is a colonial zooxanthellate Scleractinian, occurring throughout the Mediterranean [1]. The species usually forms subspherical colonies of small size [2]. Occasionally and mostly to the SE Mediterranean, these formations can be of very large size, described under the term banks [3]. Such biogenic structures, recently considered as ecosystem engineers, have been intensively studied [2, 3] but very few data exists about the structure of the associated benthic assemblages [4]. Accordingly, the aim of the present work is to contribute to the study of the fauna associated with a *C. caespitosa* bank, by providing information about species richness and distribution.

Materials and Methods
The study was conducted at the north Aegean Sea (Figure 1), where a large bank (3m high and 5 m long) has been described at 20m depth. Sampling was carried out in summer 2008 by SCUBA diving and involved: (1) the assessment of megabenthic diversity using visual census along transects, (2) the assessment of abundance of the most conspicuous, epibenthic, sessile animal species, applying the method of randomly placed frames, and (3) the collection of quantitative macrobenthic samples, by totally scraping of the substrata using a quadrate sampler (5 replicates 400 cm^2, each). The collected material was sorted, identified at species level and counted. Common biocoenotic methods were employed to analyze data.

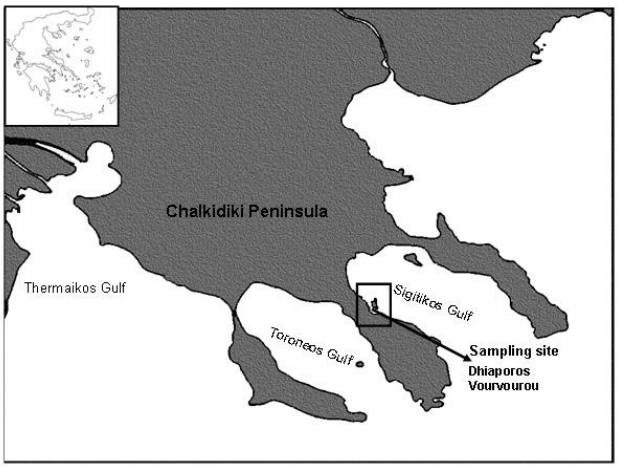

Fig. 1. Map of the study area where *C. caespitosa* bank is located

Results and Discussion
Thirty-one megabenthic animal species were recorded, 3 of which have been previously reported from *C. caespitosa* colonies [4]. The most conspicuous and abundant of these species were *Agelas oroides* (22 individuals m^{-2}), *Axinella cannabina* (5 individuals m^{-2}), *A. verrucosa* (2 individuals m^{-2}), *Chondrosia reniformis* (5 individuals m^{-2}), *Diplastrella bistellata* (19 individuals m^{-2}), *Petrosia ficiformis* (11 individuals m^{-2}), *Ircinia variabilis* (9 individuals m^{-2})and *Halocynthia papillosa* (1 individuals m^{-2}). All these species are very common at sublittoral cliffs in the Aegean Sea [5]. Fifty-four macrobenthic animal species were recorded, 24 of which have been previously reported to live in association with *C. caespitosa* colonies [4]. Polychaeta was the most speciose and abundant group, followed by Gastropoda and Peracarida (Figure 2).

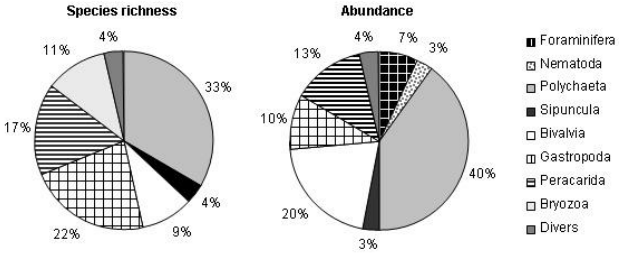

Fig. 2. Taxa contribution to species richness and abundance at the studied *C. caespitosa* bank

The species *Hiatella arctica, Syllis hyalina, Nereis rava, Trypanosyllis zebra, Vermilliopsis infundibulum, Microdeutopus anomalus, Lycidice ninetta, N. zonata, S. prolifera, Modiolus adriaticus, Phascolosoma granulatum, Caecum trachea* and *Paranthura nigropunctata* dominated in terms of frequency of appearance and abundance. Diversity indices gained high values, 4.83 and 0.86 for Shannon-Wiener and Pielou's Evenness, respectively. According to literature data 16 megabenthic and 212 macrobenthic species inhabit *Cladocora caespitosa* colonies at the north Aegean Sea [4]; including the results of the present study, the total number of species associated with *C. caespitosa* is increasing to 286 (242 macrobenthic and 44 megabenthic species). It seems also that the associated assemblages are probably different structured among individual colonies and banks. Considering that *C. caspitosa* is affected by necrosis under increasing temperature [6] further research is required since such mortality events could have cascade effects to the associated assemblages.

References
1 - Zibrowius H., 1980. Les Scléractiniaires de la Méditerranée et de l'Atlantique nord-occidental. *Mém. Inst. Océanogr.*, 11: 1-284.
2 - Morri C., Peirano A. and Bianchi C.N., 2001. Is the Mediterranean coral *Cladocora caespitosa* an indicator of climatic change? *Archo Oceanogr. Limnol*., 22: 139-144.
3 - Peirano A., Bianchi C.N. and Morri C., 1999. Skeleton growth and density pattern of the temperate, zooxanthellate scleractinian *Cladocora caespitosa* from the Ligurian Sea (NW Mediterranean). *Mar. Ecol. Prog. Ser.*, 185: 195-201.
4 - Koukouras A., Kühlman D., Voultsiadou E., Vafidis D., Dounas C., Chintiroglou C. and Koutsoubas D., 1998. The macrofaunal assemblage associated with the Scleractinian coral *Cladocora caespitosa* (L.) in the Aegean Sea. *Ann. Inst. Oceanogr.*, 74: 97-114.
5 - Antoniadou C., Voultsiadou E. and Chintiroglou C., 2006. Sublittoral megabenthos along cliffs of different profile (Aegean Sea, Eastern Mediterranean). *Belg. J. Zool*., 136: 69-79.
6 - Metalpa R.R., Bianchi C.N., Peirano A. and Morri C., 2005. Tissue necrosis and mortality of the temperate coral *Cladocora caespitosa*. *Ital. J. Zool*., 72: 271-276.