Macro and meiobenthic responses to oxygen depletion in the Gulf of Trieste (Northern Adriatic Sea, Italy). Preliminary results

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Previous researches carried out in the 70ies showed that some areas of the Gulf of Trieste suffer periodic hypoxic and anoxic crises. Then in 1986 began a research program in order to discover causes and consequences of oxygen depletion on the benthic communities (ALEFFI *et al.*, 1992 in press).

During 1990 and 1991, within the Alpe-Adria Project, grab macrobenthic and corer meiobenthic samples have been collected on three stations. In this paper are considered the results of the station located in the middle of the Gulf, that usually presents, at the end of the summer, low oxygen levels. This station (45°39'80 N, 13°35'40 E) is 22.5 m deep and characterized by sandy pelitic sediments (BRAMBATI *et al.*, 1983). The macrobenthic fauna belongs (according to PERES et PICARD, 1964) to the VTC biocoenosis with DC and DE elements (OREL et MENNEA, 1969). This area, since the end of August to September 1990, suffered anoxic stress accompanied by mortalities of benthic organisms. In the 1991 the oxygen level lowered gradually during the summer, reaching a minimum in October (Fig.1) but mortalities were recorded only in a near deeper area (BRIZZI and VIO, pers. comm.). The analysis of the macrobenthic samples shows a decrement in species and individuals numbers after the crisis of September 1990 (Fig.2). Further depletion in species number was discovered in July 1991 but the individuals number increased. In November 1991 a greater number of species and individuals was observed, indicating a probable recovery of the system. During all the considered period the more abundant species were *Corbula gibba, Maldane glebifex* and *Eunice vittata*, that seem so coping with low oxygen levels. These species also became greater in number, lowering the Shannon index (H) till November 1991 (Fig.2). On the other hand *Amphiura chiajei* and the other less abundant Echinodermata disappeared after the anoxic event of September 1990, confirming a lesser resistance of these animals to this stress (STACHOWITSCH, 1991).

The meiobenthic fraction (only major groups were counted) followed the macrobenthic trend in relation to the number of sampled specimens. In fact, after the anoxic crisis in 1990, the abundances dropped except for the increase of Nematoda (Fig.3), while in 1991 the whole community was reduced in number.

Finally the chi-square test calculated on the distribution of the three more abundant macrobenthic species showed highly significative differences among the four samples (Tab.1). In the same way the distribution of individuals in the major meiobenthic taxa (Nematoda and Copepoda), sampled before and after oxygen depletion in the two years, was significantly different (Tab.1).

Then the oxygen level seems to be one of the main factors influencing the evolution of both macro and meiobenthic fauna.

	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.
1990	4.65	4.09		0.37	4.70	
1991	4.37	2.63	2.20	1.63	1.28	5.35

Tab. 1 - Bottom oxygen level

	3/90	9/90	7/91	11/91
H	3.573	3.088	1.398	2.195
H max	5.392	4.644	4.170	5.087
specimens	300	145	430	463
species	42	25	18	34

Tab. 2 - Diversity

6/90	7/90	9/90	10/90	6/91	7/91	9/91	10/91	11/91
2.03	3.26	7.13	26.77	11.69	7.51	4.57	2.74	7.93

Tab. 3 - Meiobenthos - Nematoda/Copepoda ratio in 1990-1991

Macrobenthos	Meiobenthos
3/90 vs 9/90 = 33.07** 2 dgf	9/90 vs 10/90 = 76.33** 1 dgf
3/90 vs 7/91 = 42.99** 2 "	10/91 vs 11/91 = 124.72** 1 "
3/90 vs 11/91 = 14.43** 2 "	10/90 vs 11/91 = 71.90** 1 "
9/90 vs 7/91 = 130.8** 2 "	
9/90 vs 11/91 = 83.01** 2 "	* = p< 0.01
7/91 vs 11/91 = 11.64 * 2 "	** = p< 0.001

Tab. 4 - Chi-square values between samples

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