ECOLOGICAL STUDY OF THREE SARDINIAN LAGOON AS AN APPLICATION OF THE ECOSYSTEM APPROACH IN AQUACULTURE

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Faunal composition, particularly macro-zoobenthos, has been studied for years in environmental quality monitoring programs, as a valid method for assessing the ecological status of marine ecosystems. The ecosystem quality assessment has become a pressing challenge due to the increasing human productive activities in marine and brackish waters, such as aquaculture. In my PhD project, three Sardinian lagoons, Tortolì (central east coast), San Teodoro (north-east coast), and S'Ena Arrubia (central west coast), are being studied, considering the potential impact produced by the oyster farming systems present there. The macro-zoobenthic communities in the three lagoons are being investigated and integrated with major chemical-physical variables, both in the water column (e.g. pH, temperature, dissolved oxygen, salinity) and sediment (e.g. water content, organic matter, mud content). In each lagoon, samplings activities have been scheduled in each season and in 3-4 areas, according to the morphology and the extension of the lagoons, including one sampling area next to the aquaculture farming facilities. The macro-zoobenthos, sieved on 0.5 mm mesh and fixed, and the 0-2 and 2-5 cm layers of sediment for sedimentological analysis are collected by a box corer. The chemical-physical parameters of the water column are also measured by a multi-parametric probe. In the laboratory, the analysis of macro-zoobenthos and sediment samples will be carried out. The sorted macro-zoobenthos will be taxonomically identified and counted, and the biomass for each species measured. Biotic and abiotic data will be compiled in matrices, respectively species per sites/times and environmental variables per sites/times, and multivariate analyses will be performed, in order to record the between and within seasonal spatial/temporal variations, respectively. The main biotic parameters, e.g., species richness, abundance, diversity, eveness will be computed for each sampling site and time. The correlation between biotic and abiotic data will be tested. Furthermore, the benthos datasets will be used to compute biotic and diversity indices in order to evaluate the ecological status of the studied lagoons. In case of negative impacts (excessive organic load) attributable to the aquaculture facilities, possible measures of mitigation will be proposed in the framework of the innovative sustainable methodologies (Integrated Multi-Trophic aquaculture, IMTA), by the exploitation of detritivore and filter feeder organisms, as a restoration and remediation tool for marine environments. This on the wave of the promising perspectives currently tested in the Mar Piccolo of Taranto.