

Fish farm impacts on meiofauna and the microbenthic loop in *Posidonia oceanica* meadows



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Introduction:

For about ten years, fish farming has been expanding and its impact on the surrounding environment is important. For example, meadows of *Posidonia oceanica*, the endemic seagrass of the Mediterranean Sea, are fading close to those exploitations. This seagrass is used as an indicator of perturbations but it does not react quickly. So, it is proposed here to use the microbenthic loop (organic matter, bacteria, microphytobenthos and meiofauna) of this ecosystem to detect earlier those perturbations. The exergy index, measuring the distance between an ecosystem and its optimum state (climax), is also calculated on that loop, in order to show its interest in ecological studies.



Fig.1: Sampling sites, Calvi Bay, Corsica, France.

Results:

Relative abundances and diversity are similar in both sampling sites, which is confirmed by the MDS graph (Fig.2). The most abundant organisms are nematods and foraminifera. However, Oligochaeta are more abundant at fish farm than in STARESO.

Total abundance and biomass trends to decrease with the depth in the sediment (Fig. 2). There is no difference between both sites unless for the biomass in the zone 1-2 cm, which corresponds to the depth of redox discontinuity at the fish farm site.

The similarity analysis realised using the biomass of every part of the microbenthic loop shows a difference between sites in the zone 5-10 cm. The same result is got for the exergy index (Fig.3).

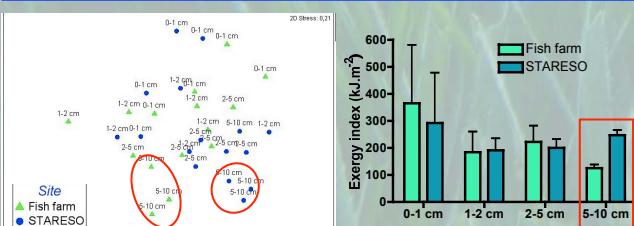


Fig. 3: Bray-Curtis similarity based on the biomass of every components of the microbenthic loop, exergy index (mean \pm SD).

Bibliography: 1. Gobert et al., 2009. Marine Pollution Bulletin. 2. Joseph, 2009. Master thesis, University of Liège, Belgium.

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Material and methods:

-Sampling sites (Calvi Bay, Corsica, Fig.1): *P. oceanica* meadows situated in front of the research station STARESO (control site) and next to the fish farm of Calvi (depth of 22 m, in November 2008).

-Sampling strategy: 4 sediment cores were used to quantify each part of the microbenthic loop. They were divided in 4 (0-1, 1-2, 2-5 and 5-10 cm).

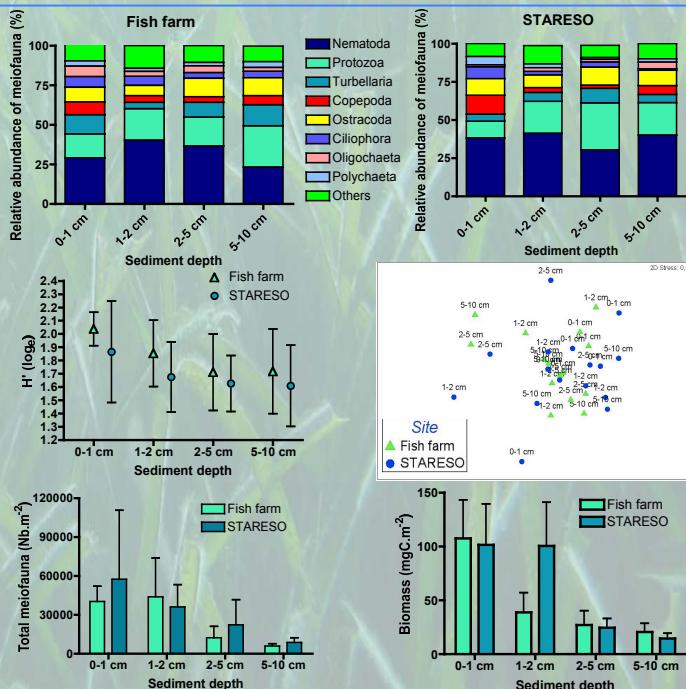


Fig.2: Relative abundance of meiofauna at the fish farm and in STARESO, Shannon diversity index (mean \pm SD), MDS based on Bray-Curtis similarity, total abundance and biomass of the meiofauna (mean \pm SD), for each slice of sediment.

Discussion and conclusions:

Both sites are not very different on the meiofauna point of view. It is consistent with results given by the PREI index^{1/2}. However, the study of the microbenthic loop and the exergy index shows that they seem to be more sensitive to perturbations. It suggests that microbenthic loop and exergy index are good tools in monitoring strategies .