PRELIMINARY OBSERVATIONS ON THE VARIATIONS IN THE MARINE MACROINFAUNA IN FISHED AND UNFISHED AREAS

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Abstract
This paper reports the findings of a study conducted in the northwestern Mediterranean to evaluate the differences in the macroinfaunal community in a fishing ground and an unfished zone. Univariate analyses of number of taxa indicated that the infaunal community differs significantly in fishing ground and in the unfished zone. Multivariate analyses revealed that the communities in both fished and unfished areas are also significantly different.

Key words: trawl, sea bed disturbance, macroinfauna

Introduction

The most important demersal mobile gear used in Mediterranean fisheries is the bottom trawl. The towed gears are the most perturbative form of anthropogenic disturbance to benthic habitats. Interesting results have been achieved in 1 and 2. Recently, investigations has began on the impact of the bottom trawl on the sea bed in the Mediterranean (3-5).

This paper reports the preliminary findings of one study conducted in the northwestern Mediterranean to evaluate the effects of bottom trawl on fishing grounds. The aim of this paper is to provide information on the possible differences between fished and unfished areas at the macroinfauna level.

Material and methods

Two zones, one intensively fished at 50 m depth, and other unfished at 60 m depth, were chosen in order to study the differences in their macroinfaunal communities. The study area is located in southern Catalonia (NW Mediterranean), where the fishing ?eet of Sant Carles harbour operates. The sea bottom is characterised by a very wide shelf (at some points over 65 km), with a predominance of muddy-sand and mud bottoms, in?uenced by the Ebro river (6). A total of 23 0,1m ^{2} van Veen grabs were sampled (11 in the fishing area, and 12 in the unfished area). To establish the minimum area representing the biocenose, cumulative curve was done. After sieving through a 1 mm mesh size, the specimens of each haul were identified and counted. Then, the same calculation was made for the amount of successive cumulative grabs, after the addition of specimens per species was made for every composition of samples. PRIMER statistical software (7) was used to perform multivariate analysis on the community data. A cluster analysis using the Bray-Curtis similarity index calculated on square root transformed data and dendrograms formed using the group average clustering method. The resultant similarity matrices were used to perform non-metric multidimensional scaling (MDS) (8). The non-metric MDS algorithm is an iterative procedure, constructing the MDS plot by successively refining the positions of the points until they satisfy, as closely as possible, the dissimilarity relations between samples.

Results and discussion

The results of minimum area were that 0.54 m ^{2} is enough to represent this biocenose in both areas.

A total of 69 species or major taxa were collected. The effect of fishing disturbance was already detectable, with significant differences in the number of species, 56 in the fished zone and 63 in the unfished zone (t Student Nº taxa = -2.383, $p<0.03$). The abundance percentage of taxa in the fished area: Polychaeta 39,3%; Sipunculida 1,8%; Echinodermata 3,6%; Crustacea 37,5%; and Mollusca 17,8%; in the unfished area: Polychaeta 36,5%; Sipunculida 1,6%; Echinodermata 3,2%; Crustacea 33,3%; and Mollusca 25,4%. The MDS showing samples in figure 1. Two major groups can be observed. Group f comprises the samples from fishing area and group c samples from unfished area. The samples of unfished and fished areas were clearly grouped in different assemblages. The two sampling sites were clearly distinct ($R= 0.617$ $p= 0.001$; ANOSIM one-way). The value of stress (0.19) indicates an excellent representation of the relationship between the samples.

These are preliminary results of the differences between areas intensely exploited by trawlers and areas not trawled due to wrecks or other obstacles.

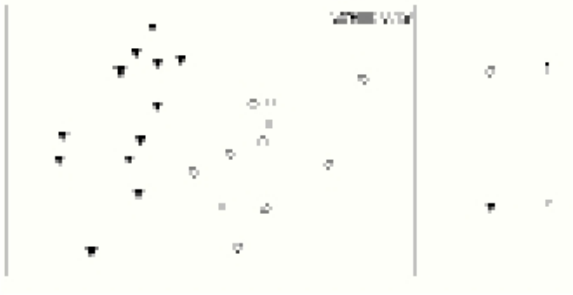

Fig. 1. MDS of samples (fished=f; unfished=c).

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