

EVALUATION OF THE LEVEL OF TRAWLING PERTURBATION ON SOFT BOTTOMS USING ACOUSTIC REMOTE SENSING AS A PROMISING APPROACH FOR FISHING EFFORT ESTIMATION

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Abstract

Fishing pressure was evaluated using side scan sonar at 5 Mediterranean coasts subjected to different levels of trawling disturbance. The work evidences that trawling effort can be accurately estimated using an indirect method. These results have been compared with fishing effort data from commercial fishery and discussed in the context of its implications for management

Keywords: Fisheries, Acoustics, Zoobenthos, Biodiversity

Introduction

Bottom trawling is one of the major sources of damage to the benthos and habitats. Thus, there is an urgent need for developing tools focussed on achieving efficient management of fishing effort and to reduce its impacts [1, 2]. It is difficult to estimate the fishing effort of the trawl fleet both at a small scale and consistent with commercial fishing activities around the world [3]. Furthermore, this information is essential to analyse both the response of benthic communities and the levels of bottom disturbance in relation with gradients of fishing effort [4]. This study has been developed in the framework of the project COMSOM (CTM2008-04617).

Methods

Five coastal areas located over Mediterranean continental shelves were selected: two in Spain, Cataluña and Murcia coasts, one in Italia, Tyrrhenian coast, and one in Greece, Ionian coast. Each area, that is located between 40 and 70 m depth, subjected to the trawling activity of commercial fishing fleets, and under variable level of fishing effort, were sampled with side scan sonar (SSS) [2]. The images obtained by SSS were analysed by a computer-aided planimetric analysis to determine the density of trawl marks. In a parallel way, information on commercial fishing activity was obtained from data gathered by the fishermen's association of each selected fishing port.

Results & Discussion

Information on fishing activity and in situ evaluation of the daily activity of the trawl fleet in each coastal area permitted the identification of three levels of fishing pressure at each area: high, medium and low activity. On the other hand, the densities of trawl marks were estimated by 75 m range sonographs and between 5-7 m above the bottom. Both results offer a reliable estimation of the fishing effort at a small scale. The results are presented only in the case of the Ionian coast, as an example. The number of trawlers and GT*hours devoted to fishing activity during the period Oct2008-May2009 suggest 3 sites with different level of fishing activity (Tab1)

Tab. 1. Distribution of fishing effort in three sites of Ionian coast

IONIAN COAST	Site A - Patra Medium effort	Site B - Killini High effort	Site C- Katakolo Low effort
Nº trawlers/year	18	17	11
GT*days/month	10.603	17.255	5.593
Trawl tracks density	23 trawl tracks	39 trawl tracks	13 trawl tracks

The images of SSS follow the same pattern: in a line of 150 m range the number of trawl tracks showed higher number of trawl tracks in site B, less number in site A, and few in site C (Tab.1;Fig 1).



Fig. 1. Trawl marks at the three sites off the Greek Ionian Coasts. From right to left: medium, high, and low fishing effort counted along 150m range

From these results we can generalise patterns of trawling disturbance over different habitat types and regions which effort restriction patterns must be applied to reduce benthic ecosystem disturbance [2,4]. The use of indirect methods to adequately determine the trawling effort would provide with the potential to develop tools for properly managing fishing activity. In this context, a methodology for determining the level of ecosystem disturbance that can be standardised over different community types would be very useful to allow a comparison of the state of soft-bottom communities from continental shelves.

References

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