STRUCTURE OF INFAUNAL COMMUNITIES UNDER VARIABLE TRAWLING DISTURBANCE

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Abstract
Macroinfaunal communities subjected to different gradients of trawling disturbance were analysed to investigate responses related with trawling effort. Results showed a decrease of abundance and richness with increasing effort, highlighting the benefits of effort restriction to protect marine communities.
Keywords: Biodiversity, Coastal Management, Continental Shelf

Introduction
Fishing activities impacts marine communities and habitats [1], being necessary the incorporation of ecosystem protection in management [2]. We need to gain knowledge on the extent of commercial trawling impact in order to develop actions to reduce disturbance [3]; however pristine areas within trawling grounds are rare, and we have little knowledge about unexploited situations [4]. Aiming to understand the effects trawling intensity on communities we compared the macroinfaunal community at 4 soft bottoms subjected to different regimens of trawling disturbance.

Material and Methods
The 4 sites are located within soft bottoms around 50m depth from the NW Mediterranean. The first study area (A) is located in a fishing ground. This fishing ground includes a portion of undisturbed seabed due to the remains of an abandoned oil platform (area B). The area C is located adjacent to Medes Islands MPA, north from the previous two areas, where occasional trawling takes place. The area D is located inside the MPA where trawling is prohibited. Each area was sampled with a 0.1 m^2 van Veen grab at 5 stations, with 5 grabs randomly collected at each station to obtain the minimum sampling size. Samples were sieved over 1 mm, and organisms were identified to the lowest taxonomical level recording number of individuals. A one-way ANOVA and a Tukey post-hoc test were performed to identify differences between areas.

Results
Abundance is significantly different at all sites ($p>0.01$); being higher at B and D sites (Fig. 1a). Species richness is significantly higher at D ($p>0.001$), whereas it is similar at the other three areas (A, B, C) (Fig. 1b).

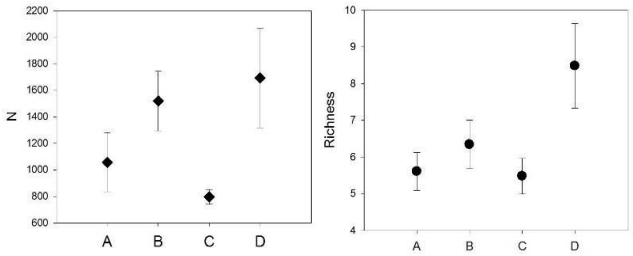

Fig. 1. Abundance and richness (number of species) at the four study areas

70 taxa were collected at area A, 84 at B, 63 at C and 105 at D. Polychaetes is the most abundant group at either area: A, 74%; B, 73%; C 68%; and D 39% (Fig. 2). The second most abundant group at A and B is crustaceans (16%). C holds 6-8% of abundance of each of the groups crustaceans, bivalvia, sipunculida and cnidaria; and D: 26% of sipunculida, 13% bivalvia, 8% crustacean and 6% ophiurids.

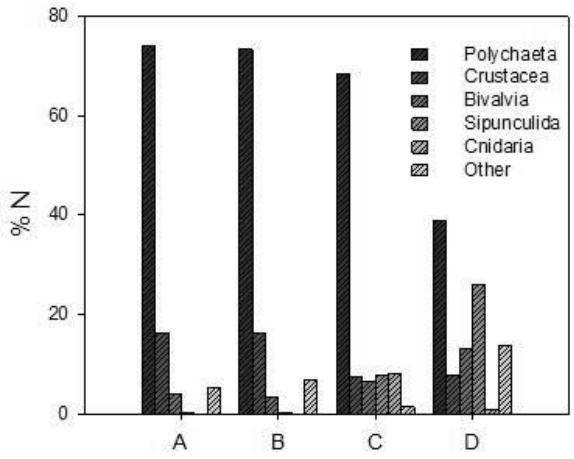

Fig. 2. Percentage of taxonomic groups at the four study areas

Discussion
Trawling reduces the faunal abundance by eliminating the most vulnerable organisms [4]. This pattern is observed in the results with higher abundance at both the MPA and the undisturbed area within the fishing ground. Moreover, trawling might reduce the species richness by increasing dominance of opportunists and species with low vulnerability to trawling [1]. Our results agree with this as the MPA holds higher richness. The four communities are dominated by polychaetes, however the MPA presents lower dominance with higher abundance of other groups. The less disturbed areas maintain more structured communities, suggesting that trawling intensity must be reduced to protect marine habitats from degradation [3, 4].

References
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