DISTRIBUTION AND DENSITY OF DISCARDED LIMESTONE SLABS USED IN THE TRADITIONAL MALTESE *LAMPUKI* FISHERY

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Abstract

The Maltese *Coryphaena hippurus* fishery employs fish aggregating devices anchored to the seabed by limestone slabs that are discarded after each season. It is estimated that more than 15,000 such slabs are deposited on the seabed each year, thus the number of limestone blocks left on the seabed by the decades-old fishery must be quite high. This study attempted to estimate the distribution and abundance of limestone slabs in the sea around Malta. The abundance of slabs was much less than expected, implying that a mechanism that gradually removes slabs from the surface of the seabed is operating in the area studied.

Keywords : Pollution, Fisheries, Trawl Surveys.

Introduction

Coryphaena hippurus (Maltese: *Lampuki*) is a key species targeted by the Maltese fishing industry, accounting for ca 40% by weight of the total annual catch [1]. Lampuki are captured by means of FADs which are anchored using limestone slabs (the same that are generally employed in the Maltese building industry). When the *lampuki* season (September-December) is over, fishermen retrieve the FADs but leave the slabs behind and each year fresh slabs are used. Considering that this traditional fishery is decades-old, and that more than 15,000 FADs are laid each year [2], the number of slabs that have been deposited on the seabed over the years must be substantial. The aim of this study was to estimate the density and distribution of limestone slabs on the seabed around Malta, as a preliminary tstudy of their ecological effects.

Methods

Limestone slabs were collected by trawling during a research cruise of the RV *Sant' Anna* made in July 2005 as part of the ongoing MEDITS trawl survey programme [3]. Slabs were recovered from 45 hauls (45-700 m) distributed around the Maltese islands (Fig. 1); 59% of the swept area was located on FADs trajectories (these trajectories have remained constant for decades), while the remaining 41% of the trawled area was non-FAD area where the laying of such devices is illegal. The slabs collected were classified into age categories: pre-1976, 1976-1980 and post-1980; age could be determined from the dimensions of the slabs, since these building blocks have a standard size which was changed at known times [4]. The mean abundance of limestone slabs was calculated. A map showing the abundance of slabs at each station was superimposed on a map of FAD distribution around the Maltese islands to see if the blocks are being dispersed from the points of deposition.

Results and discussion

The total number of limestone slabs (l.s.) was 28 in 3.5 km^2 of swept area (8 l.s. km^{-2}), 15 of which were found in 1.4 km^2 of non-FAD area (10.5 l.s. km^{-2}) and the remaining 13 were found in 2.1 km^2 of FAD area (6.1 l.s. km^{-2}). This implies that slabs were more common in areas where the laying of FADs is not allowed than in areas where FAD trajectories are allocated (Fig. 1).

The reasons for this can be threefold: (1) the illegal deployment of FADs in non-FAD areas; (2) the use of slabs for other purposes, such as ballast to stabilise fishing boats when empty, the slabs then being disposed of randomly; (3) the movement of the limestone slabs from their point of deposition to other areas. Even though at the depths sampled water currents of sufficient strength to move the heavy slabs are not likely, the blocks may still be moving as a result of trawling activities, which generally involve an initial clearing of the area to be trawled from litter, and disposing of this in other non-trawled areas.

61% of the slabs collected were of recent origin, deposited after 1980; 25% were from the 1976-1980 period, while pre-1976 slabs constituted a mere 14%. Assuming that the number of FADs laid has remained constant over the years, it would appear that in the area surveyed, blocks are being removed from the seabed with time. Two plausible explanations can be either that the slabs were cleaned by trawlers from the area studied (all sampling stations in this study were located in areas where trawling is permitted), or that the limestone blocks are gradually sinking into the sediment until completely buried. However, whilst still on the seabed, the blocks can serve as islands of hard substratum on the otherwise soft sedimentary bottoms surrounding the Maltese islands at the depths sampled, thus increasing biodiversity by providing attachment space for epibiota [5]. Nonetheless, the slabs can also have detrimental effects as a result of smothering sessile biota. They can also inhibit exchange between the water column and the interstitial waters of the sediments, although this might be negligible since the overall surface area covered by the blocks is very small (ca 23 x 26 x 60cm).

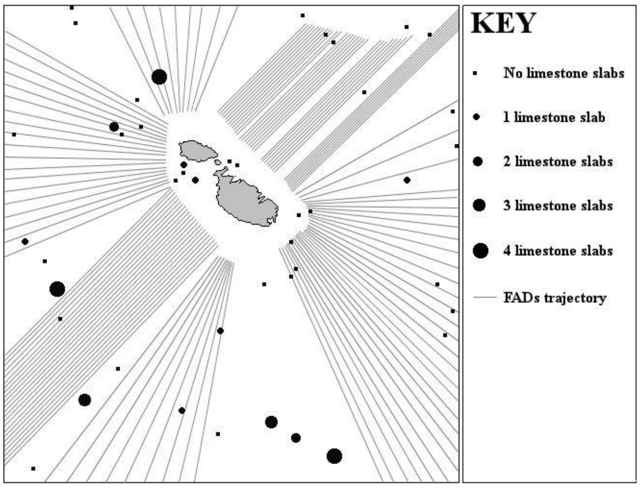

Fig. 1. Standardised abundance of limestone slabs at each station (dots), superimposed on a map of FAD distribution around the Maltese islands.

Conclusions

Even though the traditional *lampuki* fishery has been in existence for decades and more than 15,000 slabs are deployed each year, the estimated abundance of limestone slabs was much lower than expected. This implies that in the area studied mechanisms are operating to remove the slabs from the surface of the seabed, counterbalancing the yearly input of blocks.

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