

MEAN TROPHIC LEVEL ESTIMATION OF THE CATCH OF VARIOUS FISHING GEARS (N. AEGEAN)

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Abstract

The mean trophic level (mTL) for the fish catch of bottom trawlers, purse seiners and trammel nets that operate in the northern Aegean Sea was estimated and compared aiming to examine the possible impact of various gears on the marine ecosystem. The mTL of the catch was 3.89 (± 0.021 S.E) for the bottom trawls, 3.69 (± 0.035 S.E) for the trammel nets, and 3.33 (± 0.029 S.E) for the purse seines.

Keywords: Aegean Sea, Fisheries, Food Webs

Introduction

Trophic level (TL) is an ecological indicator widely accepted and used for quantification of the ecosystem effects of fishing and for the management of fisheries resources [1]. Fishing in the Thracian sea is carried out by bottom trawls, purse seines and small-scale fishing gears. The mean trophic level (mTL) of their catches can be used to quantify whether a fishing gear removes high or low trophic level organisms from the ecosystem and the extent each gear contributes to the fishing down of the marine food webs [1]. The aim of the present study was to estimate the mTL of the catches of the three most commonly used fishing gear (purse-seines, bottom trawls and trammel nets) in the northern Aegean Sea.

Materials and Methods

Data were collected by on board sampling during 2004 in the Thracian Sea (northern Aegean Sea). Thirty-six seasonal trials were performed by each gear with commercial vessels. Regarding trammel nets, 9 different mesh sizes were used (36, 42, 60, 64, 72, 76, 80, 84, 90 mm full mesh of inner panel). The mTL of the fish catches was estimated by gear, and weighted by the weight of each species participated in the catch. The mTL of the three gears was compared with ANOVA and the Fisher's LSD test was used to determine which means were significantly different from which others. The values of TL used were obtained from literature [2], [3].

Results and discussion.

The estimated mTL of the total catch was 3.89 (± 0.021 S.E) for bottom trawls, 3.33 (± 0.029 S.E) for purse seines, and 3.69 (± 0.035 S.E) for trammel nets (Fig. 1). The comparison of the mTL per gear indicated that there was a statistically significant difference between the means of the 3 gears (ANOVA, F-Ratio:108.75, $p < 0.0000$). The mTL of trammel nets ranged according to target species from 3.3 (for *Mullus* sp) to 3.9 (for large specimens of Sparidae). The above gears operate in different way and exploit different stocks or different parts of the same stock. Bottom trawls, fish a great variety of demersal and benthic mainly piscivorous species therefore, the mTL of their catches was the highest among the gears. Purse seines fish in the pelagic domain and catch pelagic, planktivorous species of small and medium size thus, the mTL of their catches was lower. Trammel nets exploit certain sizes and species of demersal and benthic fish. The mTL of their catches increased with the mesh size as a consequence of the positive relation between TL and body length [4]. Conclusively, it could be said that bottom trawls contribute more than the other two gears to "fishing down the marine food web". However, the removal of vast quantities of lower TL species, as it happens with purse seines catches, might lead to bottom up cascading effects that also affect negative the marine ecosystem.

References

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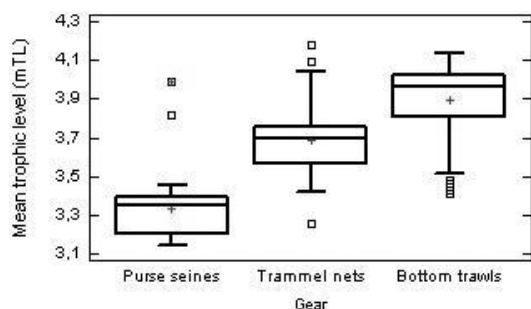


Fig. 1. Box-whisker plots of mean trophic level (mTL) per gear