

COMPARISON OF TRAWL SURVEY AND COMMERCIAL DATA ON SMALL PELAGICS FROM THE FAO GEOGRAPHIC SUB-AREA 9 (WESTERN MEDITERRANEAN)

M. Sbrana^{1*}, S. De Ranieri¹, A. Ligas¹, B. Reale¹, I. Rossetti² and P. Sartor¹

¹ Centro Interuniversitario di Biologia Marina ed Ecologia Applicata (CIBM), Livorno - Italy - msbrana@cibm.it

² Aplysia Soc. Coop. r.l., Livorno - Italy

Abstract

Trawl survey data on *Engraulis encrasicolus* and *Sardina pilchardus* have been compared with the official available statistics on landings in the FAO Geographical Sub-Area 9 (GSA9). A high correspondence between the two sources of data has been found for anchovy, while for sardine the two data series showed some differences with an evident decreasing of the survey index and more fluctuating trend for landing data.

Keywords: Pelagic, Trawl Surveys, Fisheries, Ligurian Sea, Tyrrhenian Sea

Introduction

Anchovy, *Engraulis encrasicolus*, and sardine, *Sardina pilchardus*, are two of the most important pelagic marine resources in the FAO Geographic Sub-Area 9 (Ligurian Sea and Northern and Central Tyrrhenian Sea). In this area a well developed fishery targeting them with purse seine is performed by the local fleets and by vessels coming from the south of Italy during the fishing season. Official statistics show that the biomass landed in this area represents a significant portion of the total landing registered in Italy for these two species. In spite of this, no specific scientific surveys have been carried out in the past in order to evaluate the biomass at sea and to collect information useful to assess the exploitation state of these two important resources. Since 1994, the GSA9 has been included in the MEDITS project for the evaluation of the demersal resources [1]. Although this survey is targeted to investigate species living near the bottom, the characteristics of the net employed (high vertical opening of the mouth) allow to regularly catch species living in the water column, as the small pelagics. The present study aims to compare the trends in biomass of the two populations with the commercial landings. A possible correspondence in the trends of the two data series will strengthen the possibility to use MEDITS surveys data also as valuable indicator of the abundance of small pelagic species.

Materials and Methods

The study was performed in the FAO GSA9, where the experimental trawl survey MEDITS has been carried out from the beginning of the project (1994) to the present. The gear used for the data collection is a bottom trawl designed for experimental fishing with scientific purpose [2]. The net vertical opening slightly higher (2.5 m) to that of the most common professional gears allows to significantly catch species less related to the bottoms like small pelagics. A cod end of 20 mm mesh size (stretched mesh) is employed. The experimental hauls have been allocated by means of a stratified sampling design with random drawing inside each depth stratum. Although the surveys cover the shelf and the upper slope from 10 to 800 m depth, the time series of mean biomass (kg/km²) were calculated for the macro-stratum 10-200 m, where the two investigated species are concentrated. A biomass index (kg/km²) has been computed according to Souplet [3]. Official statistics on commercial landings to be compared with survey data have been provided by the Italian Istituto Nazionale di Statistica (ISTAT) for the period 1994-2000 (www.istat.it); since 2001 the Istituto di Ricerche Economiche per la Pesca e l'Acquacoltura (IREPA) has been charged to monitor the economic aspects of the Italian fishing sector, including landing statistics (www.irepa.org). For each species, the two time series were analysed by means of the cross-correlation function [4].

Results and discussion

MEDITS data for anchovy shows high biomass indices of this species in the period 1999-2003, whilst the minimum values are observed in the last years. A similar trend of the total landing recorded in the GSA9 is found, with maximum biomass landed in correspondence to that estimated at sea. For this species a significant cross-correlation has been obtained ($r = 0.54$). For sardine the correspondence between experimental and commercial data is less evident. Landing statistics and trawl survey biomass estimations showed a very high parallelism just for the period 1994-1999. In the case of the trawl survey data, the trend is characterised by a drastic and continuous decrease; landing decreased till 1997 and high fluctuations of the values are observed in the period 2000-2008. For sardine the cross-correlation resulted not significant. The good correspondence between landing and survey trends supports MEDITS survey as a promising descriptor of anchovy abundance at sea, at least in absence of more precise data. In the case of sardine, the decreasing

trend obtained from MEDITS data does not fully match with landing data. In spite of this, MEDITS could represent an useful source of information also for this species. However, it is important to take into account that sardine is not the target of the small pelagic fishery, thus is not landed on a regular basis. When anchovy is abundant, the fishermen avoid to land sardine and larger amount of the species is often rejected at sea.

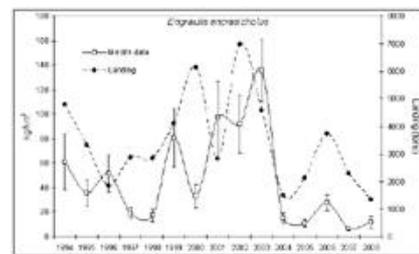


Fig. 1. *Engraulis encrasicolus*. Trends of the MEDITS biomass index (kg/km² +/- standard deviation) and total landing in the GSA9

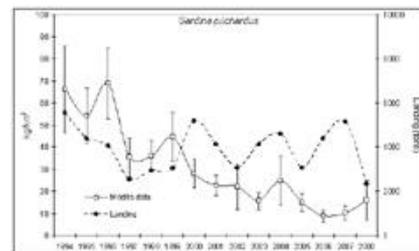


Fig. 2. *Sardina pilchardus*. Trends of the MEDITS biomass index (kg/km² +/- standard deviation) and total landing in the GSA9

References

- Bertrand J.A., Gil de Sola L., Papaconstantinou C., Relini G., Souplet A., 2002. The general specifications of the MEDITS survey. *Sci. Mar.*, 66 (2): 9-17.
- Fiorentini L., Dremière P.-Y., Leonori I., Sala A. and Palombo V., 1999. Efficiency of the bottom trawl used for the Mediterranean international trawl survey (MEDITS). *Aquat. Living Resour.*, 12 (3): 187-205.
- Souplet A., 1996. Calculation of abundance and length frequencies in the MEDITS survey. In: J. Bertand (ed.), *Campagne internationale de chalutage demersal en Méditerranée (MEDITS). Campagne 1995, Vol. III. Rapport final de contract CEE - IFREMER - IEO - SIBM - NCMR (MED/93/020, 0, 18, 006, 004)*.
- Cleveland, R.B., Cleveland, W.S., McRae, J.E. and Terpenning, I., 1990. STL: a seasonal-trend decomposition procedure based on Loess. *J. Official Statistics* 6, 3-73.