

TREND OF TRAWL CATCHES IN THE LIGURIAN SEA

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Abstract

Two short time series of biomass indexes deriving from national (GRUND) and international (MEDITS) trawl surveys were used to describe the variation in the commercial catches during 1985 to 1998 in the Ligurian Sea (NW Mediterranean).

Keywords : demersal resources, trawl surveys, biomass index, Ligurian Sea

Introduction

Since 1985 onward, within the framework of Italian Law L.41/82 and national coordination on demersal resource assessment (1, 2, 3), the team of the Laboratory of Marine Biology and Animal Ecology at present belonging to the Dip.Te.Ris. (University of Genoa), carried out trawl surveys. The team is also involved, since 1994, in the MEDITS project – Mediterranean International Trawl Surveys (4). The aim of these researches is the knowledge of the exploitation state of the demersal resources caught by trawlers and in our specific case in the Ligurian Sea (NW Mediterranean Sea). In this note we present a brief description of the abundance dynamics regarding the overall commercial catches (kg/h) during seasonal trawl surveys performed in the Ligurian Sea from 1985 to 1998 within the frame of GRUND and MEDITS projects. Furthermore, biomass indexes has been processed to study the situation on shelf and slope both in term of catch per hour and in term of percentage variation in respect of the mean value of the overall period (only for the GRUND survey).

Material and method

The commercial catches regards all Teleosteans, Selachians, Cephalopods, Crustaceans and other (mainly Gastropods and Bivalve) that are important from economical and scientific point of view. The dataset consist of standardized catch index obtained during the otter trawl surveys from 1994 to 1998 (MEDITS) and from 1985 to 1998 (GRUND), carried out in spring and in late summer/early autumn (2, 5). Day-light hauls were effected on the bottoms ranged between 10 to 800 m depth off the ligurian coast. Catches per hour of trawling were used to estimate average index of biomass for strata (0-50, 50-100, 100-200, 200-500 and 500-800m depth). An average weighed in respect of trawling hours for strata was used to obtain a yearly value both for shelf (0-200 m depth) and slope (200-800 m depth). Finally, a percentage variation in respect of the overall mean for fishing ground (shelf and slope) was processed.

Results

In Table 1 GRUND catches per hour for year and strata are shown. Highest values are recognized in the first stratum (0-50m depth) with a maximum in 1990 of 93,9 kg/h. In the deeper stratum (500-800m depth) a minimum value of 5,3 kg/h was obtained. Mean yearly values ranged between 13,52 kg/h in 1986 and 32,34 kg/h in 1992.

Table 1 – GRUND commercial species catches in kg per hour of trawling during the summer (*) or autumn per year and per stratum. () In these years the second and third strata were pooled together.**

| Year | 0-50 | 50-100 | 100-200 | 200-500 | 500-800 | Mean |
|--------|------|--------|---------|---------|---------|------|
| 1985* | 27,0 | 16,3 | 9,1 | 16,2 | 19,9 | 17,7 |
| 1986* | 17,2 | 14,4 | 12,2 | 12,9 | 12,3 | 13,5 |
| 1987* | 17,1 | 10,7 | 7,6 | 24,9 | 15,8 | 16,8 |
| 1990** | 93,9 | 22,0 | | 9,5 | 11,2 | 31,0 |
| 1991** | 78,6 | 7,7 | | 12,0 | 5,3 | 23,9 |
| 1992** | 84,3 | 21,4 | | 17,3 | 7,6 | 32,3 |
| 1993** | 46,5 | 13,1 | | 13,9 | 7,2 | 19,0 |
| 1994 | 37,7 | 15,7 | 12,1 | 26,5 | 15,9 | 21,4 |
| 1995 | 17,5 | 61,7 | 38,2 | 41,5 | 20,1 | 31,9 |
| 1996 | 80,5 | 22,2 | 53,1 | 21,6 | 8,0 | 25,5 |
| 1997 | 30,1 | 13,3 | 15,0 | 20,6 | 13,0 | 17,5 |
| 1998 | 71,7 | 18,7 | 25,1 | 14,0 | 13,0 | 22,0 |

In Table 2 MEDITS catches per hour for year and strata are shown. The first stratum shows highest values in 1996, 1997 and 1998 (2.50, 2.39 and 2.45 kg/h), while in 1994 and 1995 maximum values were obtained in the third stratum respectively 2.30 and 8.13 kg/h; the latter is the highest value recognized in the overall period. Minimum values were obtained in 500-800 m depth, except in the 1994 in the first stratum (0.82 kg/h) and 1997 in the fourth one (0.56 kg/h) that it's also the lowest value in the period (94-98). Mean yearly values ranged between 1.15 kg/h (1997) and 3.23 kg/h (1995).

Table 2 – MEDITS commercial species catches in kg per hour of trawling during the spring per year and per stratum

| Year | 0-50 | 50-100 | 100-200 | 200-500 | 500-800 | Mean |
|------|------|--------|---------|---------|---------|------|
| 1994 | 0,82 | 1,34 | 2,30 | 1,08 | 0,88 | 1,28 |
| 1995 | 2,01 | 3,81 | 8,13 | 1,36 | 0,83 | 3,23 |
| 1996 | 2,50 | 1,98 | 0,99 | 0,97 | 0,73 | 1,43 |
| 1997 | 2,39 | 1,27 | 0,64 | 0,56 | 0,90 | 1,15 |
| 1998 | 2,45 | 1,87 | 1,94 | 1,43 | 0,66 | 1,67 |

In figure 1 GRUND commercial catches on shelf and slope and overall mean of the period are shown. Generally the shelf value are higher than the slope ones, except in 1987, 1994, 1995 and 1997. For the shelf the highest values were recognized in 1990, 1991 and 1992 trawl surveys, instead for the slope the maximum was in 1995. In 1987 and in 1991 the minimum values were obtained respectively for the shelf and slope.

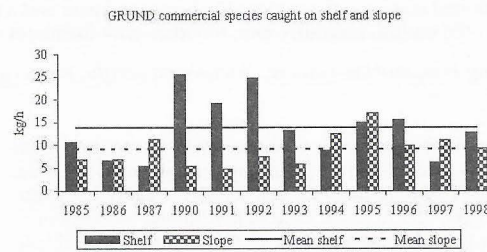


Figure 1. GRUND commercial catches on shelf and slope and the overall mean (respectively 13,67 kg/h and 9,04 kg/h) of the period.

In figure 2 MEDITS of all commercial catches on shelf and slope and the overall mean of the period are shown. Shelf values were higher than the slope ones for the overall period. For the shelf the highest values was recognized in 1995 (about 5 kg/h), instead for the slope the maximum was in 1995 (about 5 kg/h).

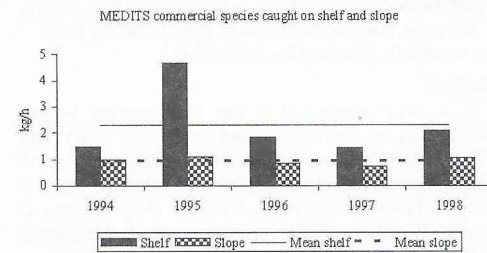


Figure 2. MEDITS commercial species caught on shelf and slope and the own overall mean (respectively 2.3 kg/h and 0.94 kg/h) of the period.

Figure 3 show the GRUND percentage variation of yearly catch per hour in respect of the overall mean for the two fishing grounds. Shelf values oscillated around the own mean, instead slope values show two phases. In the first, between 1985 to 1993 (except 1987), the yearly values were under the mean, while from 1994 onward were higher.

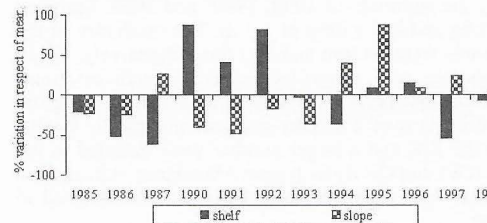


Figure 3. GRUND percentage variation of yearly catch per hour in respect of the overall mean for the two fishing grounds.

Discussion

Standardized commercial catches, given by stratified national and international trawl surveys, show that, generally, catches per hour on the shelf bottom are higher than slope ones. MEDITS catch per unit effort is lower respect to the GRUND one. This fact can be explained considering that the recruitment process of some of the main demersal species (i.e. red mullet) occur in autumn (the season in which GRUND trawl survey is performed) (6). GRUND percentage variation of yearly catch per hour in respect of the overall mean for shelf and slope show different pattern for the two fishing grounds. In fact shelf values fluctuate around the own mean, instead slope ones show two phases: in the first, between 1985 to 1993 (except the 1987), the yearly values were lower than the mean, while from 1994 onward were higher. Finally, no clear trends in trawl catches are detectable both for GRUND and MEDITS. So it is important to continue and improve the monitoring of biomass indexes by trawl surveys taking into account other possible forcing variables like environmental factors and fishing effort.

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