

# TARGET SPECIES AND CPUE OF TRAMMEL, GILLNET AND COMBINED NET IN SANDY AND ROCKY BOTTOMS

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## Abstract

Catch Per Unit Effort data have been used to evaluate the performance of the most common bottom-nets utilized by the tuscanian artisanal fisheries. Fishing experiments were carried out since 1976 with three different nets in four areas with various environmental characteristics. Total productivity and C.P.U.E. of target species are described in relation to both gear type and fishing grounds.

*Key-words* : fisheries, instruments and techniques, Tyrrhenian Sea

## Introduction

Trammels, and gillnets are the most common gears in the artisanal fisheries along the Tuscany coast. This activity represents an important productive reality since it involves more than 1300 fishermen and 600 boats with annual catches over 4000 tons. The traditional boats are fairly small, between 4 and 10 m of length with an average of 1 gross tonnage and engine of 15 KW; the mean age of this fleet is 15 years, even if some of them are over 30. Nevertheless, in the last decades only a couple of scientific works (1,2) have been published on this topic. Also in the whole Italy only few papers point to the productivity of artisanal nets (3,4,5).

## Materials and Methods

The collected data arise from 556 fishing experiments carried out during the last 20 years closely south of Livorno in 4 areas with different environmental characteristics: A zone with sandy bottom and depth lower than 15 m ; B zone with rocky bottom and depth lower than 15 m ; C zone with intermediary grounds to the precedings ; D zone with muddy bottom of the slope around 30 m depth. The fishing experiments have been performed from the sunset to the dawn using from 500 to 1000 m of net of three different types: Bottom trammels are 1.5 m high with internal mesh size of 21 mm and external mesh of 150 mm (223 experiments). Gillnets are 3 m high with 35 mm mesh size and 0.25 mm nylon filament diameter (used in 255 experiments). The combined trammel-gillnets are high 5 m. the upper gillnet of 3.5 m has 35 mm mesh size, the lower trammel has 31 mm and 200 mm mesh size (78 experiments).

The whole catch has been sorted to species level, weighted and counted. The data stored in a database have been standardized into Catch Per Unit Effort (CPUE) expressed in grams for 100 m of net.

## Results

Globally, it has been fished 94 species of fishes, crustaceans and cephalopods, even if only 20 of these represent in weight more of the 90% of the catch (Fig.1).

The CPUE were analyzed in relation to the used gear: the combined trammel-gillnet is the more productive (1133 g/100m) with the trammel (1012 g/100m), while the productivity of gillnet is significantly lower (684 g/100m).

Error estimate of total catch was computed by means of standard deviation between years: in all cases it is close to 300 g/100 m (298, 269 and 273 g/100 m respectively). Statistical analyses show that catch data from trammel are normally distributed while those from gillnet are lognormal. This is related to the catch composition: trammel catches are mainly groundfishes close to the bottom (the net is 1.5 m high) with elements of territorial behavior and consequent random pattern. The catches of gillnet (3 m high) are dominated by semi-pelagic species clustered in shoals (7) which determine lognormal distribution.

The target species of gillnets are grey mullets (*Liza ramada* 75 g/100 m, *Mugil cephalus* 56 and *Chelon labrosus* 55) and salem ( *Sarpa salpa* 101 g/100 m). These species are common also in the combined net (*Liza ramada* 100, *Chelon labrosus* 52, *Mugil cephalus* 39 and *Sarpa salpa* 116), but in this case the catch is dominated by cuttlefish (*Sepia officinalis* 298 g/100 m) and rays (*Raja clavata*, *R. asterias* and *R. undulata*, 218 g/100 m altogether). The trammel catches mainly scorpionfish (*Scorpaena porcus* 193, g/100 m), cuttlefish (*Sepia officinalis*, 176), *Octopus vulgaris* (169), mullet (*Mullus surmuletus*, 84) and wrasse (74 g/100 m).

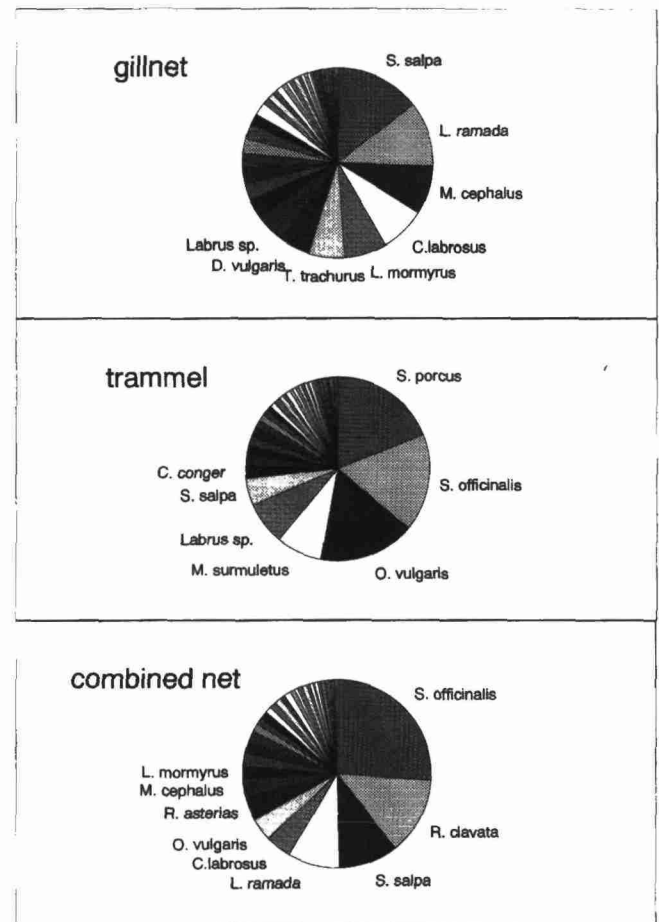


Figure 1 : Catch composition of the different nets.

In relation to the environmental typology of the bottom, the gillnet catches are similar in all the coastal areas (793 g/100 m in A zone, 569 in C zone, 617 in B zone) and lower offshore (217 g/100 m in D zone). On the other hand, the trammel productivity increases from the sandy grounds toward the rocky grounds (652 g/100 m in A zone, 888 in C zone and 1315 in B zone) and depth (1593 g/100 m in D zone).

Obviously, the species composition changes too: on sandy bottoms about 20 % of the yield is composed by cuttlefish alone, significant are also grey mullets and striped bream (*Lithognathus mormyrus*). On intermediate grounds octopus, scorpionfish and red mullets increase while cuttlefish slightly decrease. Catches in rocky areas close to the reefs are dominated by scorpionfish, octopus and red mullets. In the D zone (30 m depth) the main species is the pandora (*Pagellus erythrinus*) which represents about a half of total catches.

The 20 years of available data have been analyzed looking for quantitative trends in the CPUE of some species and/or gears. The fluctua-