

ASSESSMENT OF STOCK AND SPATIAL DISTRIBUTION OF SOLE (SOLEA SOLEA, L.) IN ALBANIAN COAST USING RAPIDO TRAWL

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Abstract

Common sole (*Solea solea* Linnaeus, 1758) is still not a specific target of fishery in Albania, but it represents an important target of the mixed-species catches of bottom trawlers and set netters operating in the coastal areas in the upper part of Albanian Adriatic Sea. Sole landings are low, amounting very few tonnes, but the demand will likely increase in the next future, because of the high quality of the fish fillet and the increase of consumers demand for wild sea fish. In order to identify the spawning areas and assess the spatial distribution and biomass of this species a rapido trawl survey was performed in year 2007. The smallest specimens were mostly concentrated in the shallowest stratum and the largest ones between 30 and 100 m depth. Solea Stock Biomass (SSB) was 354 t, corresponding to 64% of the overall population recorded at sea at that time. In the context of fisheries, the Albanian fishing fleet involve a number of different fishing gears, while rapido trawl is introduced recently. The special technical and operating characteristics of rapido trawl makes it very effective in sole fishery and less harmful for the sea benthos and the species inhabiting it. This study aimed the estimation of spatial distribution of common sole and its biomass in the Albanian coast using rapido trawl gear.

Key words: *S. solea*, rapido trawl, Albanian coast.

1. Introduction

The common sole is one of the most commercially important species of the Mediterranean Sea. About 22% of the catches from the Mediterranean and Black sea come from the Adriatic Sea and especially from the northern and central parts of the basin [5, 11, 8, 15], which seem to be also important areas of concentration and reproduction of sole. It is widespread in the Adriatic Sea, especially in the northern part. In the northern and central Adriatic, the distribution of this species depends on maturity [6, 12]. According to Jardas [8], the common sole is distributed from coastal waters to depth of 250 m. Data from tagging experiments conducted by Pagotto *et al.* [9] and Pagotto and Piccinetti [10] showed that the majority of the common sole population of Adriatic move from north to south along the Italian coast and, probably, from south to north along the eastern Adriatic coast. It is a demersal and sedentary species, living on sandy and muddy bottoms, mostly in rivers and near the river mouths and also digging into sea bottoms [14, 3, 8].

Beside the trawl multi species catches, in the Adriatic Sea the sole represents the target species of rapido trawl and gillnet, whose use has increased in the last ten years either as number of vessels, fishing areas and fishing time over the year. Rapido trawl is constructed by a net with cod end, in its mouth is applied a metallic construction which holds in the

upper part a wood table (depressor) and in the lower part a series of iron teeth which mine the bottom and pick up the animals in there. This fishing method is practically a prerogative exception of Adriatic fleet. This is according to the traditions of these fleets also to the special characteristics of the bottoms. This gear was introduced in some fleets of North and Central Adriatic between the years '50 and '60 and rapidly replaces the so called sfogliara.

Despite its economical importance, the sole has been relatively poorly researched in the Eastern Adriatic coast. This study aimed the estimation of common sole spatial distribution and biomass in the Albanian coast using rapido trawl.

2. Materials and Methods

The fishing activity was carried out in Adriatic Sea in year 2007, as part of Solemon Project, with Dallaporta vessel. The research in the Albanian maritime space started from the mouth of Buna River to the so called area of Triport, near Vlora. As the sole distribution is strictly dependent on depth, 3 depth strata were identified: 0-30 m (stratum 1: 3,792 km²), 30-50 m (stratum 2: 1,638 km²) and 50-100 m (stratum 3: 8,168 km²). The sampling stations were randomly allocated inside each stratum according to stratum extension and supposing homogeneous densities of sole at each depth range. The hauls were

carried out at each sampling site towing the rapido trawl at a speed of about 5.5 knots.

Abundance and biomass indexes were computed using ATrIS software [7] which also allowed drawing GIS maps of the spatial distribution of the stock, of spawning females and of juveniles. Underestimation of small specimens in catches due to the gear

selectivity was corrected using the selectivity parameters given by Ferretti and Froglia [2].

3. Results and discussion

Specimens in the catches had a Total Length ranging from 17.0-42.0 cm, corresponding to the age interval 0+/9.

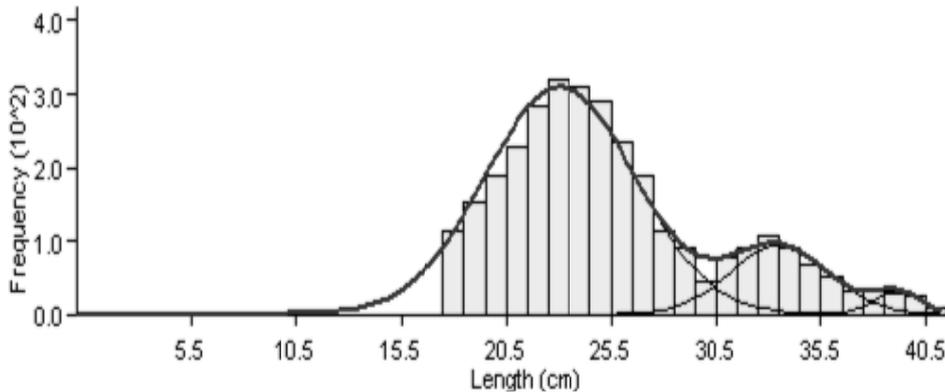


Figure 1. Length catch curve over three classes of *S. solea* in Albanian coast.[13]

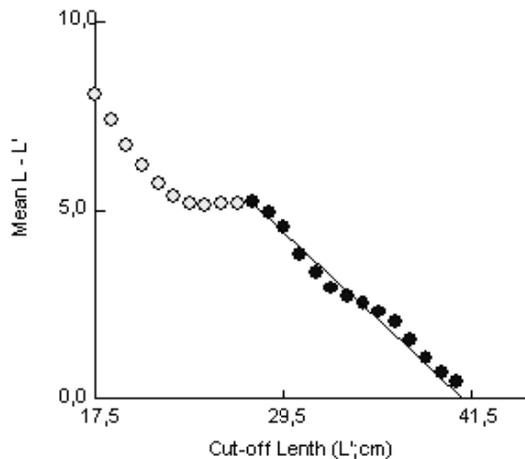


Figure 2. Length converted catch curve of *S. solea* [13]

As expected, the smallest specimens were mostly concentrated in the shallowest stratum and the largest ones between 30 and 100 m depth. Density (individuals km^{-2}) and biomass (kg km^{-2}) amounted to 472 (CV=47%) and 54 (CV=41%) in stratum 1; 197 (CV=46%) and 53 (CV=53%) in stratum 2; 137 (CV=24%) and 32 (CV=26%) in stratum 3. The

highest abundances and biomasses were recorded along the upper Albanian coast. The relative biomass (catchability coefficient assumed as 1) estimated for the overall area was around 550 t.

Spawning females ($\text{TL} \geq 26$ cm) were mainly recorded along the eastern coast, with the highest densities in a small area at North of Buna river mouth. SSB (Solea Stock Biomass) was 354 t, corresponding to 64% of the overall population recorded at sea at that time.

Recruits ($\text{TL} \leq 20$ cm) were exclusively caught along the eastern coast. They amounted to 31 ind. km^{-2} (CV=45%) and 2 kg km^{-2} (CV=43%), and the estimated relative recruitment was 27 t, representing only 0.05% of the overall biomass at sea.

According to the data collected rapido may represent a non neglected part of fishing effort used in some areas. Injuries suffered from non target species had resulted to be less than from other gears and was related with the species morphology. The most sensitive species to damages caused by the gear used were those that have not solid and resistant body structures.

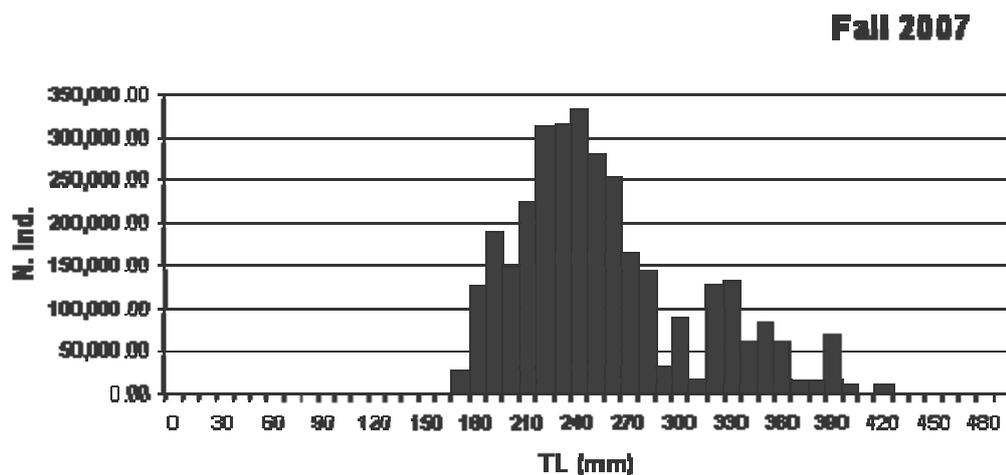


Figure 3. Length-frequency distribution of *S. solea* caught at Albanian coast.[13]

As cited by Bini [1], rapido must not be considered harmful to the industrial fishing economy or detrimental for the juveniles, if used in depths more than 15 m. However, the impact of the gear on different benthonic communities is still not very well studied. These studies, beside others, will explain the reasons that have modified some biological interactions in the Adriatic in the last decades [4]. The effects on the marine environment are a direct function of the effort used in the area. Monitoring the status of sole stock on time and space would be advisable in order to get useful information for developing a rational exploitation of this resource in the Adriatic Sea.

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