STUDY ON THE DYNAMICS OF FISH CATCHES IN THE ROMANIAN MARINE WATERS DURING 1950-2009

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Abstract

Worldwide, it is recognized and appreciated the significant role it has continental and marine fisheries, and aquaculture, both by contributing to food supplies and the economic and social well-being of populations worldwide.

Evolution of main species of fish catches from the Romanian marine waters was obtained by centralizing and systematizing in time, catch and effort data obtained from the profile companies. Data analysis was performed for the period 1950-2009.

Depending on the status of fish populations, fishing effort applied and the type of tool used, the Romanian seaside catches had a variable evolution of the structure of qualitative and quantitative. Usually the Black Sea ichthyofauna and in particular populations of commercial interest in recent decades have witnessed severe mutations and often unpredictable. Fish fauna from the Romanian coast includes, potentially, over 142 species and subspecies. Many fish populations have declined so rapidly that they have lost importance in commercial fisheries, marine ichthyofauna only remaining representatives of zoological species. During the period 1960 – 1970 there were 26 commercial species of fish; now their number has gradually decreased, remaining at present about ten pelagic species with commercial importance, all three small-sized demersal species.

Key words: Black Sea, catch, commercial species, fishing

INTRODUCTION

Since ancient times, fishing has been a major source of food for mankind, providing employment and economic benefits to those who practiced it. It admitted that living aquatic resources were a gift of nature with unlimited abundance.

But with the enrichment of knowledge and dynamic development of the fisheries sector that followed the Second World War, this myth has disappeared, being found that those living aquatic resources, although renewable, are not infinite and must be administered carefully if we are to keep their contribution to the nutritional well-being, economic and social development of a growing world population.

Black Sea ichthyofauna has undergone major changes over the last 60 years, both in qualitative and quantitative structure and the behavior of different species. These changes are a consequence of anthropogenic activities, fishing pressure directly and indirectly by environmental deterioration, particularly in the West Sea.

MATERIAL AND METHOD

Qualitative and quantitative composition of fish catches was obtained from fisheries statistics has been achieved by centralizing periods of time and dates from the profile companies and interviews with fishermen. Fishing effort (no. of vessels, no. seines, days of activity) was obtained from company dates and records kept by the National Agency for Fisheries and Aquaculture. The statistical dates used to assess allowable catch exploitable biomass.

Samples taken in preparation for the study of fish populations were composed of a minimum number of 200 copies, for each species, collected completely at random into

four groups of 50 individuals from four different places to catch a few pounds of fish the marine catch taken at random from the purse of fishery points located along the coastline between Periboina and Vama Veche.

However, samples were taken from hauls made with industrial fishing vessels, as well as survey research conducted with the ship NIMRD.

Length is measured (total, fork, etc.), length range used, the measurement (by sex or both sexes together) are depending on the species, species size and sexual dimorphism. Average weight of specimens in each class is determined by weighing the overall length of all specimens of length classes and the values measured are recorded on the form to be obtained by calculation based on all samples. Large specimens are weighed individually.

RESULTS AND DISCUSSION

Black Sea ecosystem appears to have been stable until the second half of the twentieth century. The first sign of a significant deterioration of the Black Sea ecosystem has been changing the composition of commercial species of fish catches during the period 1970-1980.

Correcting the several decades of excessive use of Black Sea resources is a goal that requires enormous efforts from all stakeholders and the general public that lives in the Black Sea region.

To ensure the conservation and sustainable management of marine fishery resources are necessary measures to stop or eliminate the overcapacity of fishing effort by controlling the level is consistent with their sustainable exploitation.

Quantifying livestock is a main objective in fishing strategy to achieve sustainable production [1].

Depending on the status of fish populations, fishing effort applied and the type of gear used, the Romanian littoral catches evolved structure of qualitative and quantitative variable.

In the period 1950-1979 based on the Romanian seaside fishing was done with seines, trap type tools installed perpendicular to the shore, from Sulina and Mangalia. Their number has fluctuated from 76 in 1953 to 140 in 1965 [7].

Annual purse was made up to 70% of the total caught during the fishing was organized with specialized tools, or for mullet (1953-1955), or turbot (1953-1956) and blue mackerel or bonito (1954-1958) [4].

Production purse exceeds even 80% (in the years when fishing with these tools is running almost exclusively), the percentage decreased to about 50 times during the catches of *Alosa spp* greatly increased (1974, 1975), reaching to 1097 tonnes, 2698 tonnes respectively, taking into account that for these particular species of fish using nets.

The percentage of high value species like sprat and anchovy catches their constancy explains large fluctuations in annual catch made at the Romanian seaside: from 3120 tonnes in 1969 to 11,088 tonnes in 1961 (Fig. 1).

These oscillations occur more so as the fishing takes place in a small area of coastal settlements maintenance conditions are highly variable. Danube Delta region, the most important fishing area for sprat, especially in the summer months, has lost importance in the mentioned period. In this area, production declined sharply, due sprat which represent 50% as average fish species in the North before 1969 decreased approximately 15% [8] (Fig. 1).

Most of sprat catches were made in the North, where the fish comes to over 70% of the total annual quantity of sprats [1,7].

Anchovy, a second species of importance in the Romanian littoral catches in this period (1950-1979), participated in the total catch, with values ranging from 110 tons in 1953 and 3230 tonnes (approximately 41% of catches) in 1972.

A third species of great importance in fishing with purse is the horse, which represent between 1.7 percent annual total catch (1956) and 36.9 (1966). There is a periodic fluctuation in the catch, caused by the emergence of generations of horse stock abundance of this species that increase and maintain reserves at a high level 2-3 years. Thus, between 1950 - 1979 the Romanian

seaside horse capture ranged between 67 t (1956) and 2200 t (1961), 1,500 tons of fish catches resulting in only 1966 and 1976.

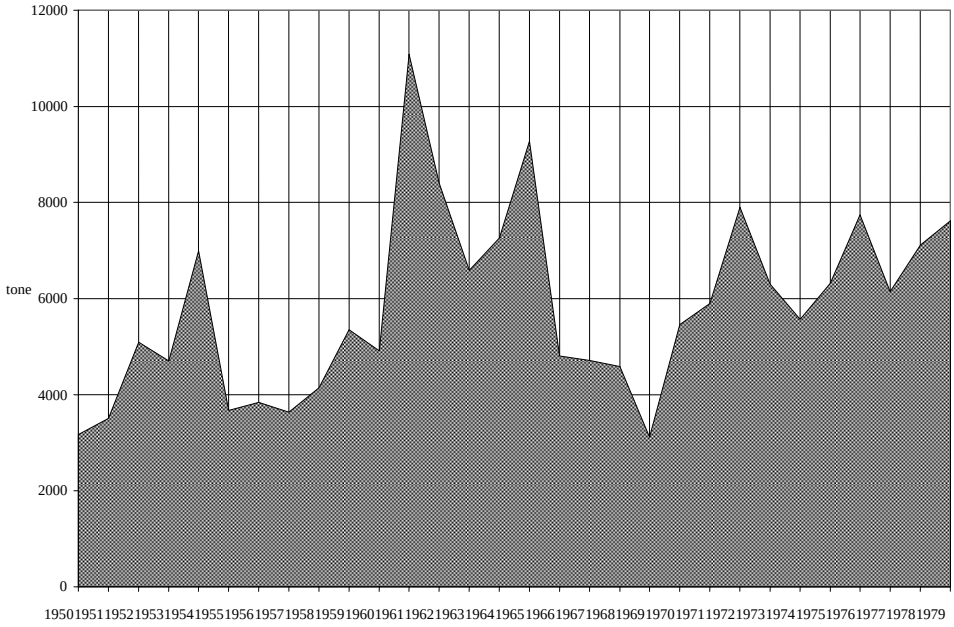

Fig. 1 Total catch (t) made at the Romanian seaside in sea fishing in the period 1950 to 1979

Predators such as blue mackerel and bonito did not exceed a few years than in the period under review, 300 t. From the analysis of catch data by species performed at the Romanian coast, it appears that blue mackerel is no longer appears in catches after 1967 and the bonito is not reported after 1970.

It seems that stocks of these species have suffered a significant drop due to unfavorable conditions for their reproduction and feeding of the Marmara Sea [8], and due to degradation of environmental conditions especially in the north-western Black Sea.

During 1980-2009, a drastic reduction or disappearance of traditional kidnappers Black Sea ecosystem (blue fish, blue mackerel, bonito, dolphin) have determined, on the one hand increase the resources of small pelagic fish (sprat, anchovy, mackerel) that were feeding these predators, and on the other hand increased abundance of predators such as sharks and southern hake [5].

Fisheries dynamics of main species of economic interest in the Romanian seaside during 1980-1990 reveals the dominance of pelagic species, and of these, sprat helped capture a share of total 42.7% 27.3% followed by anchovy, horse 8,9% alos 5.2%, other pelagic species participating in the aggregate catch Romanian marine area at a rate that is below 0.2% (Fig. 2).

Regarding the capture of the main pelagic species from the Romanian coast in the interval 1980-1990, is taking shape following situation [6]: for sprat it ranged between 989 t (1980) and 9473 t (1987) for anchovy in the range of 5 to t (1990) and 6431 t (1980), while the average horse production fluctuated between 165 t (1990) and 2666 t (1987).

During the period analyzed, the species demersal fisheries have been subject to the Romanian coast, was the dominant southern hake, with a catch which ranged between 615 t (1987) and 3138 t (1985). In terms of the sturgeon catch in the reference period, it took between 4 t (1990) and 56 t (1984).

Regarding the main pelagic fish from the Romanian coast during 1991-2000, the

anchovy catch is found that ranged between 45 t (1997) and 374 t (1993), for the horse reduction period from 1980 to 1990 was and more evident, the catch ranged between 1 and t (1997) and 48 t (1991), the range of variation was alos 45 t (1997) and 255 t (1991), even for sprats which was the dominant species in fishing, the difference between minimum catch (729 tons) and maximum catch (3.388 t) was great (2.659 t).

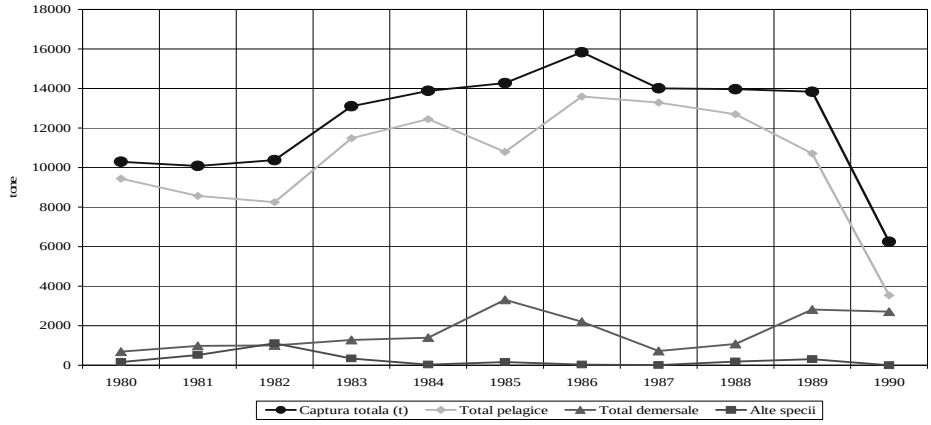

Fig. 2 Catch (t) the total pelagic and demersal species at the Romanian seaside in the period 1980-1990

On fishing for demersal species is observed the same differences between catches in the period 1980-1990 and the last period of analysis (1991-2000).

Thus, in terms of the sturgeon catch from the Romanian coast is found that the catches of 4-56 t (1980-1990) it was caught about 1 t.

Even for southern hake and between species is the dominant species of demersal catch fluctuation during 1980-1990 was 615-3138 t, while the oscillation period 1991-2000 was 59-1357 t.

If carried out between 1980-1990 in the Romanian seaside multi catch was 12,354 tons in the coming years it has declined by about four times, in the last eight years (2001-2008), fell to 1575 t (Fig. 3) .

For the main pelagic species are found down the same differences in terms of multi-annual catch among the three periods 1980-1990, 1991-2000 and 2001-2008. Thus, although the dominant species in catches, multi-catch of sprat decreased from 5273.6 t (1980-1990) 2221.4 t (1991-2000) to 1170.4 t (2001-2008).

The same decreasing trend is noticed in the other pelagic species fisheries covered by the Romanian coast. Thus, anchovy, this multi-catch reduction was more evident, namely from 3378 t (1980-1990) to 158.2 t (19991-200), amounting to 132 t (2001-2008).

Regarding the horse, there is a worrying reduction of multi-annual catch of 1097.2 tons in the period 1980-1990 reached only 14.9 t in 2000-2008. Alos, silverside and kilka annual average catch is also declining particularly in the range 2001-2008.

The trend of multi-catch reduction is also evident in the case of demersal species [2,3]. Thus, southern hake, the catch has declined from 1517 t (1980-1990) to 115.4 t (2001-2008), for sturgeon difference was 34.6 t (1980-1990) to 6.3 t (1991-2000); for mullets from 24.7 t (1980-1990) to 4.9 t (1991-2000) and for multi-shark catch has declined from 48.7 t (1980-1990) 4, 5 t (2001-2008) (Fig. 3).

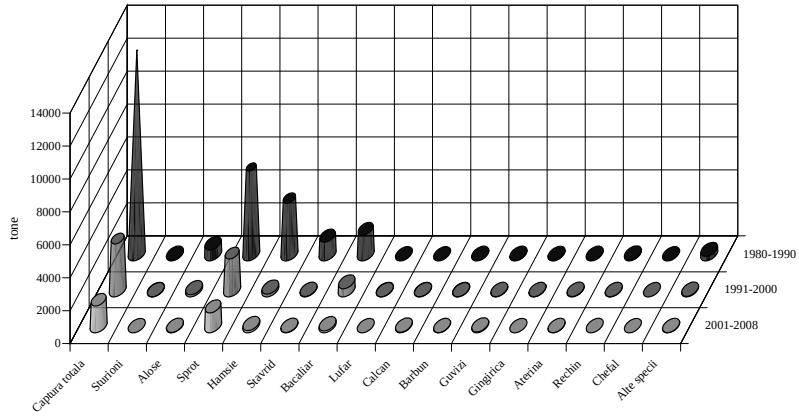

Fig. 3 Multi-annual catch (t) of the principal species of the Romanian coast (1980-2008)

Fish fauna from the Romanian coast includes, potentially, over 140 species and subspecies [6,7]. Changes in the composition is particularly remarkable in the number of individuals in specific populations.

For many fish populations have declined so rapidly that they have lost the importance of commercial fishing, marine ichthyofauna only remaining representatives of zoological species.

During the '60s and '70s there were 26 commercial species of fish production that gave hundreds of thousands of tons in the entire Black Sea basin.

Their number has gradually decreased, remaining at present about ten pelagic species with commercial importance, all small (sprat (*Sprattus sprattus*); whiting (*Merlangius merlangus euxinus*); anchovy (*Engraulis encrasicolus*); mediterranean horse mackerel (*Trachurus mediterraneus ponticus*); toad goby (*Mesogobius batrachocephalus*); round goby (*Neogobius melanostomus*); bluefish (*Pomatomus saltatrix*); flathead grey mullet (*Mugil cephalus*); red mullet (*Mullus barbatus ponticus*); silverside (*Atherina boyeri*)) and three demersal species (turbot (*Psetta maxima maeotica*); snouted sole (*Solea nasuta*), flounder (*Platichtys flesus luscus*)).

In the fishing season in the last two decades [5], made the catch, except the years 1990, 1992, 1993, 1997 and 1998 to 3000-4000 tonnes per year (3582 t/1997, t/1998 3503) was quite low, ranging is between 1200-2500 tonnes (2431 t/1999, 2116 t/2001, 1940 tone/2005 respectively tone/2006 1390), then declined steeply over the last three years at 435 t / 2007 and 444 t / 2008 and 331 t / 2009.

CONCLUSIONS

Brief analysis of the evolution of catches for the main pelagic fish species, the Romanian marine waters, between 1950 - 2009, reveals the following:

- Qualitative and quantitative structure of catches in the Romanian marine area had an evolution variable depending on the condition of fish populations, fishing effort deployed by the type of tool used for training and maintenance conditions and concentrations of fish, especially in the coastal area ;

- For over 20 years of Romanian marine fish species is dominant in the sprat. Although in recent years average production of sprat was falling, made special contribution to the total catch in the Romanian marine area was over 73%;

- Small-sized species that constituted the main subject in the last 20-25 years of fishing practiced in the Romanian Black Sea coast, these years have seen major fluctuations in catch, with a tendency to regress or obvious dramatic reductions;

- The status of fish stocks of commercial interest, the Romanian coast, is quite unstable, showing the tendency for anchovy and a slight recovery provides recovery for blue fish, mullet and mackerel.

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