

COMMERCIAL FISHERY OF SMALL PELAGIC FISHES ALONG THE BULGARIAN BLACK SEA COAST DURING 1925 - 2002

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Abstract

The most abundant small pelagic fishes in the Black Sea are sprat (*Sprattus sprattus* L.), anchovy (*Engraulis encrasicolus* L.) and Black Sea horse mackerel (*Trachurus mediterraneus ponticus* Aleev). These three fish species are subject of intensive commercial fishery. Sprat is a local fish species while the Black Sea horse mackerel and anchovy are highly migratory ones.

It is evident (Table 1) that during the periods 1925 – 1935 the mean catches of Black Sea horse mackerel, sprat and anchovy have been 195.3, 72.5 and 23.1 tons, respectively i.e. the total mean catch of the three fish species have been 290.9 tons. In the next 10 years (1936 – 1945) their mean catches have increased to 313.7 tons (horse mackerel), 396.3 tons (sprat) and 112.8 tons (anchovy) i.e. total mean catch of 822.8 tons. This trend proceeded in the next 10 years, too (1945 – 1955) however the catches have been predominated by the sprat, followed by the horse mackerel and the anchovy - 1076.3, 558.6 and 226.6 tons, respectively or total mean catch of 1861.5 tons. It is obvious that compared to the period 1925 – 1935 the total mean catch of these three species have increased about 6.4 fold.

In the next 10 years (1956 – 1965) the catches have continued to grow and their mean values reached 1602.9 (sprat), 496.0 (horse mackerel) and 222.4 tons (anchovy) i.e. total mean of 2321.3 tons. During the period 1966 – 1975 the total average catch have increased to 3231.1 tons – 2338.6 (sprat), 778.0 (horse mackerel) and 111.5 tons (anchovy). The next decade (1976 – 1985) was a period with sharp rising of fishery intensity in relation to the sprat as it is a local fish, previously mentioned, unlike the horse mackerel and the anchovy, the last two being migrating fish species. The sprat mean catch have come at 13 393.0 tons i.e. the same is over 5.7 fold higher than that from the preceding decade and over 184.7 fold larger than that documented during 1925 – 1935. The horse mackerel and anchovy catches have also increased from 778.0 to 802.4 tons and from 114.5 to 218.9 tons, respectively. As a result the total mean catch have reached 14 414.3 tons out of which the sprat catch represented 92.91 % and the horse mackerel and anchovy catches – 5.57% and 1.52%, respectively.

The period 1986 – 1995 was characteristic with abrupt decline in the catches of the fish discussed – from 13 393.0 to 5 123.3 tons (sprat), from 802.4 to 516.2 tons (horse mackerel) and from 218.9 to 26.0 tons (anchovy). The last 7 years (1996 – 2002) represented a period of prolonged decreasing of the mean horse mackerel catch – from 516.2 to 103.1 tons and to some extent that of the sprat – from 5 123.3 to 4 326.1 tons. The lowering of the catches in the sprat, however especially in 2000 and 2001 was due to primarily the lack of counting in the catches of this fish. The real catches were much higher which is consistent with the amended environment of the Black Sea ecosystem. This is shown by the statistic data for the mean anchovy catches that showed increase from 26.0 tons to 103.1 tons.

Table 1. Bulgarian catches of Sprat, European anchovy and Mediterranean horse mackerel in the Black Sea during 1925 - 2002

Year	Sprat	Anchovy	Horse mackerel	Year	Sprat	Anchovy	Horse mackerel
1925	81.1	8.6	137.6	1965	1107.8	521.6	301.6
1926	-	66.1	73.3	1966	182.7	53.7	556.7
1927	190.8	62.9	87.1	1967	661.4	96.6	245.7
1928	107.8	11.2	148.7	1968	1142.8	212.9	37.4
1929	44.6	12.4	176.9	1969	1141.5	88.0	95.9
1930	130.7	33.3	484.1	1970	1407.1	90.4	689.1
1931	55.9	17.8	273.2	1971	2472.5	126.4	630.9
1932	14.1	10.4	152.4	1972	2962.0	156.4	534.0
1933	47.6	5.7	230.6	1973	3382.7	264.0	849.0
1934	9.2	6.9	250.1	1974	4467.5	41.0	2168.8
1935	115.4	19.1	134.2	1975	5565.5	15.1	1972.8
1936	216.1	65.8	101.7	1976	7198.9	71.9	1808.7
1937	237.3	99.1	153.0	1977	8753.7	112.9	791.0
1938	544.6	96.4	283.8	1978	10596.5	37.0	565.0
1939	816.9	213.1	108.9	1979	13541.0	307.4	934.5
1940	496.1	42.8	425.3	1980	16568.0	208.9	813.0
1941	598.9	40.9	479.0	1981	18880.0	69.7	476.2
1942	271.7	98.7	325.1	1982	16524.0	265.6	366.8
1943	114.1	377.0	307.4	1983	12023.0	784.4	496.7
1944	401.7	49.9	338.0	1984	13921.0	239.3	1015.8
1945	266.0	43.8	614.7	1985	15924.0	92.3	755.8
1946	552.3	263.1	642.7	1986	11690.0	96.5	850.9
1947	1137.7	471.6	451.3	1987	10979.0	13.1	826.4
1948	2412.5	77.1	553.9	1988	6199.0	115.0	1676.8
1949	2068.3	425.6	442.7	1989	7403.0	.....	1100.9
1950	122.9	400.3	644.3	1990	2651.0	.....	164.1
1951	1568.5	104.7	736.2	1991*	2710.0	.....	232.0
1952	1161.9	181.0	564.9	1992*	2353.0	.....	82.0
1953	602.7	83.4	294.7	1993*	2174.0	.....	79.0
1954	585.0	250.5	593.2	1994*	2200.0	.....	80.0
1955	551.4	8.4	662.4	1995*	2874.0	35.0	70.0
1956	1856.8	64.7	131.5	1996**	3535.0	23.0	68.0
1957	2320.6	54.7	69.4	1997**	3646.0	44.0	36.0
1958	2343.6	132.0	233.0	1998**	3275.0	48.0	40.0
1959	1835.4	458.6	687.4	1999**	5800.0	210.0	195.0
1960	1904.0	285.5	1017.7	2000**	1736.5	64.0	111.3
1961	1188.8	129.4	1240.6	2001**	695.4	101.8	130.0
1962	1381.0	242.5	805.2	2002**	11595.0	237.0	141.5
1963	1195.4	199.5	231.4	Mean	3466.5	130.7	508.4
1964	895.2	135.3	242.0	Mean'	3511.5	141.6	508.4

Remark: * - According to FAO Fishery statistics (2000); ** - According to State Agency of Fisheries and Aquaculture; Mean' - without the years when no catches recorded - Sprat (1926) and Anchovy (1989-1994)

The indicated fluctuations in the three species catches were owing to the following factors:

1. During the period 1925 – 1970 the catches of pelagic top predators: mackerel, bonito and blue fish have been commensurable with, and in the beginning of this period (1970) even higher than that of their prey (sprat, anchovy and horse mackerel) - Fig. 1

2. Since 1970 coincident with the decrease of the pelagic predators' abundance (mackerel, bonito and blue fish) the eutrophication of the Black Sea began rapidly to increase. This led to the rise of the biomasses of the three most abundant zooplanktivorous fish species (sprat, anchovy and partially horse mackerel). The sharp growing of their catch intensity retained their biomass increase in accordance with the enlarged basin productivity.

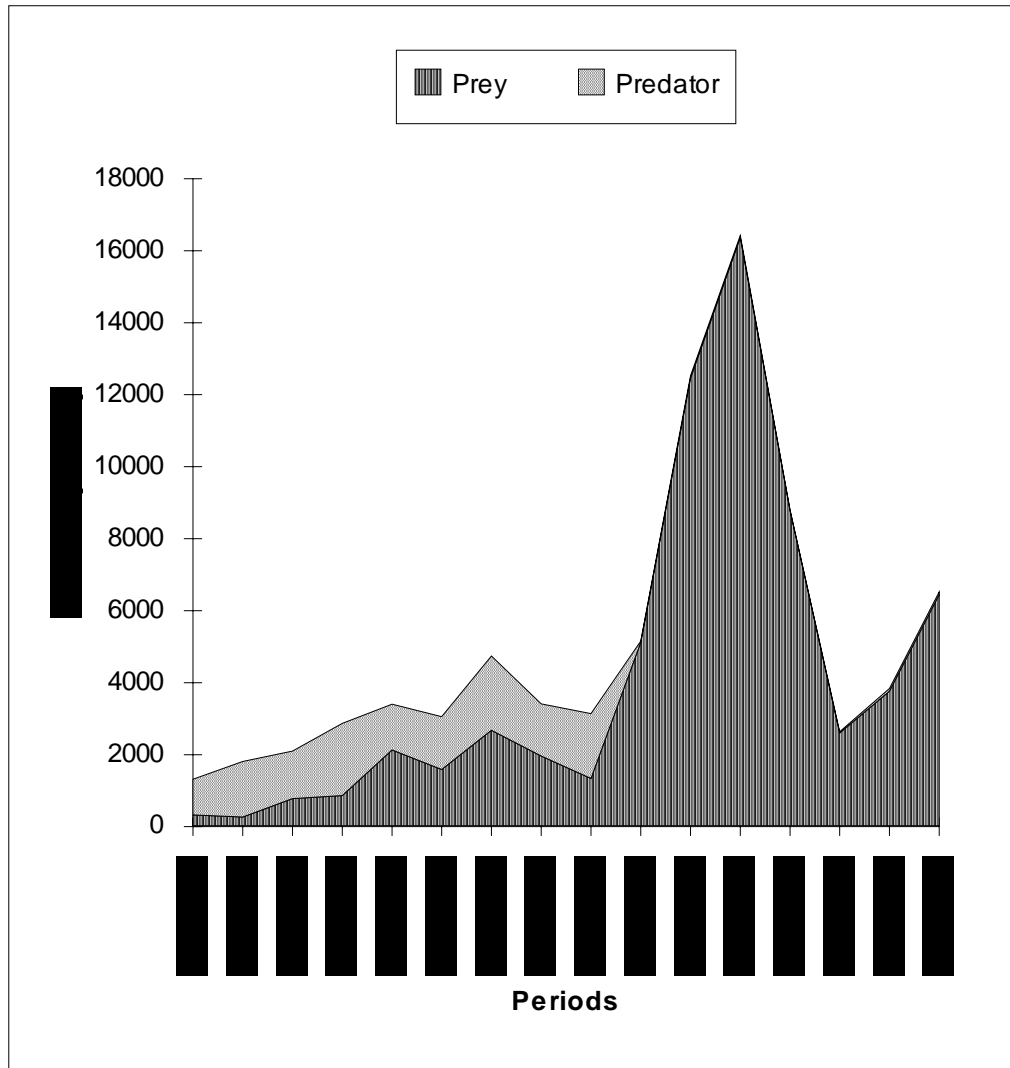


Figure 1. Total catches of prey (Sprat, Anchovy and Black Sea horse mackerel) and predators (Mackerel, Bonito and Bluefish) along the Bulgarian Black Sea coast during 1925 - 2002

The arisen imbalance between the trophic links opened widely the Black Sea ecosystem doors for entering new species, the latter finding favourable condition for large scale development.

In the early 80s it was the ctenophore *Mnemiopsis leidyi* (Georgieva, Konsulov, 1993) which after short adaptation period began quickly to extend its abundance and biomass reaching its maximum in the development in late 80s and early 90s. The ctenophore besides being powerful competitor of the planktivorous fish in relation to their food base feeds on their eggs and larvae (Tzikhon – Lukanina,

Reznichenko, 1991). As a consequence the catches of nearly all fishes appreciably dropped most dramatically those of the summer spawning fishes as the anchovy and the horse mackerel. Their catches sharply decreased from 526 462 (1988) to 86 752 (1991) tons and from 96 888 (1989) to 5053 (1993) – Prodanov, Stoyanova, 2000.

In the end of the 90s another ctenophore entered the Black Sea – *Beroe ovata* which is predator on *M. leidyi* (Konsulov, Kamburska, 1998). Concurrently, the nutrient concentration in the Black Sea began diminishing as a consequence of the economic collapse most Black Sea states experienced – less production and use of chemical fertilizer, etc. All this brought to slow improvement of the basin's conditions (Velikova, Moncheva, Petrova, 1999; Velikova et. al., 2001) the latter immediately reflecting to the fishery, too. At present the anchovy catches in the Black Sea range between 200 000 and 375 000 tons and the sprat ones – between 28 000 and 70 000. The most low remained the horse mackerel catches that vary from 15 000 to 20 000 tons.

The catches of their predators (bonito and blue fish) started to grow higher especially the second fish species. Its extremely strong 2001- year class however was a target of intense fishery in the very same year, which affected adversely its survival. The corresponding institutions authorised to control the implementation of the national legislation bear definite fault in this respect. The minimum fish catch size does not differ among the countries. It is 28 cm for the blue fish.

Conclusions

Accomplishment of annual quotas for small pelagic fish catches is necessary for their sustainable utilisation in the Black Sea. It has to be done by the corresponding institutions of each Black Sea country in relation to the local fish species (sprat) and by the Convention of Fisheries and Conservation of Marine Living Resources in the Black Sea for the highly migrating fish (anchovy and horse mackerel). The Convention is still not signed although its elaboration and co-ordination have begun in 1997.

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