Stock assessments of Sprat (*Sprattus sprattus* L.) along Bulgarian Black Sea coast (1976-1990)

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The present ecological state of Black Sea and the sharp increase of sprat catches after 1976, are the two main anthropogenic factors, determining the significant variations in the sprat stocks off Bulgarian coast and in the whole western part of the basin. This stress the necessity of annual assessments of its biomass, aimed at tacing proper measures for rational exploitation.

Materials and Methods

Sprat biomass during 1976-1990 was calculated by GULLAND's variant of VPA (POPE, 1972). Relationship between catches and the mean weighed values of fishing mortality coefficient was estimated by the following equation :

(1) $Y = a.F_{2\text{-}4}.\exp(-b.F_{2\text{-}4})$

where : Y - catch in thousand tons ; $F_{2\text{-}4}$ - mean weighed value of fishing mortality coefficient for full representative age groups.

Age composition of sprat catches is after IVANONV's data (1983, 1985, 1989, 1990).

Results and Discussion

It appears from Fig. 1 that the sprat biomass variation is from 167.5 to 204.6, avarage 179.8 thousand tons during 1976-1979. At the same period the sprat catches ammounted to 7.2-13.5, avarage 10.0 thousand tons, e.g. the sprat catches comprise from 4.07% (1976) to 8.08% (1979). However, sprat biomass decreased from 140.6 (1980) to 64.3 thousand tons (1982) during the following 3 years.

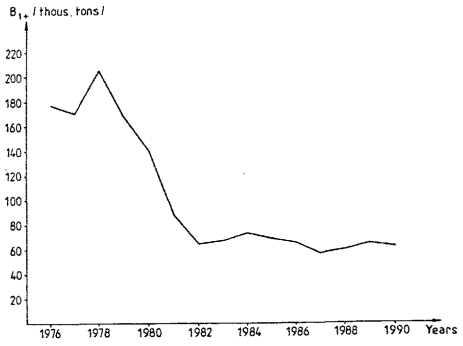

Fig. 1.- Sprat biomass (B1+.10³ tons) along Bulgarian Black Sea coast during 1976 - 1990.

After 1982 sprat biomass varies slightly from 56.8 (1987) to 73.7 (1984) thousand tons.

Largest sprat catches were recorded during 1980-1982, average 17.3 thousand tons.

For the period 1976-1985 the values of Y'msy and F'msy are 17.7 thousand tons and 0.437, respectively (Fig. 2). The last value is almost equal to this estimated by IVANOV (1984) and PRODANOV (1989)-0.435, thus differing significantly from this calculated by DOMASHENKO and YUREV (1978) - Fopt = 1.0.

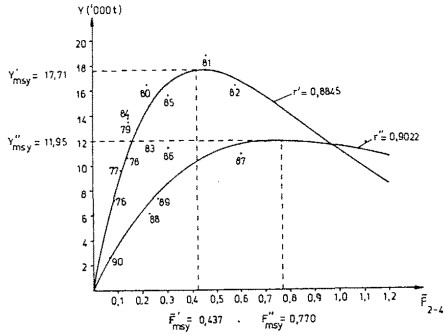

Fig .2.- Relationships between sprat catches and mean weighed values of fishing mortality coefficient during 1976 - 1985 (Y'msy; F'msy; r') and 1986 - 1990 (Y''msy; F''msy; r'')

Antropogenic eutrophication of the basin after 1978 result in dramatic changes in plankton species composition, up to invasion of new species (*Mnemia mccradiy*), distinct increase in blooms both in time and space, leading to alteration in the whole food web (MONCHEVA, 1991; KONSULOV, 1991). Probably the decrease of Y''msy during 1986-1990 (see Fig. 2) can be related to *Mnemia maccradiy* expansion after 1986.

Conclusions

The present environmental state stress the necessity of preventive catch activities - in the next 2-3 years the sprat catches along Bulgarian Black Sea coast should not exceed 10.2 thousand tons ($Y_{0.1}$ = 0.85.Y''msy; Fmsy = 0.43).

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On a nesting of the loggerhead turtle (*Caretta caretta* L., 1758) along the Southern Coast of Sicily (Mediterranean Sea)

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Six species of marine turtles are reported from the Mediterranean Sea : *Caretta caretta, Chelonia mydas, Eretmochelys imbricata, Dermochelys coriacea, Lepidochelys kempii* (MARQUEZ, 1990) and *L. olivacea* (MAIGRET, 1986).

Among these, the loggerhead turtle *C. caretta* is the most common and it is known to reproduce all over the area (DELAUGERRE, 1987; MARQUEZ, 1990). It is also the only species which was reported to nest along the Sicilian coasts and the small islands near Sicily (BRUNO, 1986; DELAUGERRE, 1987;).

In this note some information is given about hatching of *C. caretta* that occurred on the beach of "Tonnarella", along the Gulf of Mazara del Vallo (southern coast of Sicily).

"Tonnarella" beach is about 6 Km long and it is limited by the harbor breakwater and by "Capo Feto" on its east and west sides respectively (see Fig.). The area hosts the summer residents of Mazara del Vallo, and the beach is lined by a large road with runs only a few tens of meters from the sea. A low wall separates the beach from the road.

Notwithstanding the indiscriminate parcelling out of the land (the whole area is amazingly crowded with buildings) the negative effect of human activities on the water quality was until now rather negligible, due to the strong currents off the Mazara coast and to the adoption of individual cesspools as aseptic system.

The nest was discovered on August 23 1990, during the morning when people on the beach noticed juveniles of *C. caretta* reaching the sea, while other specimens were lying dead a few meters from the water. About 30 cm in diameter and 50 cm deep, the nest was located close to the small wall which separates the beach from the road.

The authors, informed immediately of the event, recovered six live specimens and twelve dead ones. Those alive were brought to the sea, while the others were preserved in formalin. The preserved specimens are between 39 and 44 mm (SCL) long and weigh between 12 and 14 gr. From the shell fragments an estimate of the size of the eggs of about 30x50 mm was derived.

Our observations, together with the information obtained by people on the beach, indicate that the first hatching occurred during the night, and that the total number of eggs laid was about 50, which is in agreement with what reported in the literature (BRUNO, 1986; MARQUEZ, 1990).

This report confirms that the loggerhead turtle is a common species all throughout the Sicilian waters, as reported by local fishermen, and that it still reproduces along the Sicilian coasts, in spite of the environmental degradation and the human settlements which obviously constitute a disturbing factor.

The fact that this is the first documented nesting of the species on Mazara del Vallo shore since many years (at least since 1983 when our Insitute officially began to operate), can be due to several reasons. Among those depending on the situation on the land, there is the accidental non-disinfection of the beach (usually carried out during May) during spring 1990.

It also probable that the proximity of the wall limiting the beach protected the nest from an otherewise almost certain destruction : each year before summer in fact, the debris of seaweeds and seagrasses (mainly *Posidonia oceanica*) which pile up on the shore during winter are removed using mechanical tools, but this operation is usually performed manually close to the wall.

In any case this record is a quite positive indication of the adaptability of these animals to the changes made to the environment by human communities. It also suggests that we should consider the proposal to protect at least part of the shore (i.e., the beach beyond "Capo Feto"), as it was already decided for other sicilian areas (i.e., Lampedusa Island).

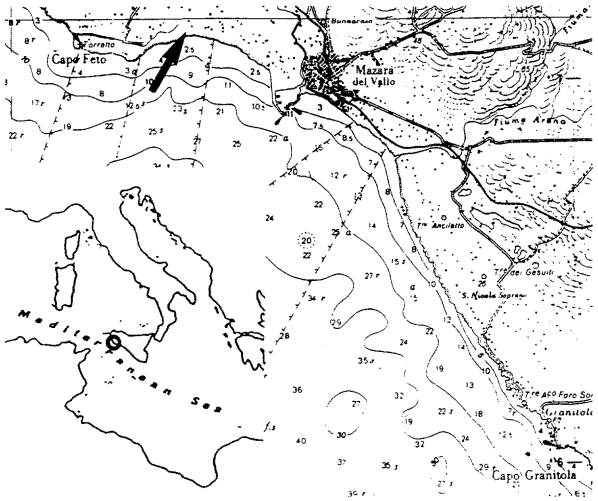

Fig. - The Gulf of Mazara del Vallo. "Tonnarella" beach is delimited by "Capo Feto" and the breakwater of the port. The arrow indicates the nest location.

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