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STOCK ASSESSMENT OF WHITING (MERLANGIUS MERLANGUS EUXINUS NORDMANN) ALONG BULGARIAN BLACK SEA COAST DURING 1976-1993

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The catches of whiting are obtained with trapnets and also it appears as bycatch in the sprat fishery with the bathypelagic trawl. All this embarrasses the correct determination of the actual catches (Prodanov,1984), on account of which the whiting has always been considered as a poorly exploited fish (Domashenko and Serobaba,1990).The largest catches have been realized by Turkey-the mean catch during 1984 - 1991 is 20.46 thousand tons. Length composition of these catches varied from 8-10 to 30-34 cm, while the Bulgarian catches ranged whitin 5-25 cm.

Material and Methods

Whiting biomass during 1976-1993 was calculated by VPA (Mesnil,1989) and Jones' length converted cohort analysis (LCOHOR)- Sparre,1987. The fishing efforts, respectively the values of F_{st} for sprat are according to Ivanov's (1983, 1989) and Daskalov's (1993) data. As it was mentioned, the whiting catches are realized mainly as a bycatch in the sprat fishery. That is why we used the sprat values for F_{st}, although the whiting is demersal fish, while the sprat is mudfish. Besides, the oldest age groups of whiting (5 and 6 years old) keep away from the shore in contrast to sprat, whose fishery is going on in the coastal zone - 25-40 m depth. Having in mind all these differences we consider that the assessment made have to examine as an attempt for determining the margin stock of whiting along Bulgarian Black sea coast.

Results and Discussion

In table 1 the results from VPA and LCOHOR are represented. It appears that, the assessments obtained by the above mentioned methods differ from one another mainly during 1990-1991. Accordig to VPA and LCOHOR analyses the initial and mean biomasses of whiting had varied from 27273.6 tons (1976) to 10893.4 tons (1988) and from 16072.3 tons (1978-1979) to 2554.1 tons (1990-1991), respectively. Having in mind the abundance of offspring, we consider that the assessments made by LCOHOR analysis reflect more correctly the actual state of whiting stocks during the last 4 years. The sharp decrease of the whiting biomass is due to the low abundant year-classes from 1987 to 1989. The increase of whiting biomass after 1991 is conditioned by the strong year-class 1990 - more than 50 and 7 times in comparison with year-classes 1987 and 1988, respectively.

Arkhipov and Rovnina's (1990) data confirm the considerable decrease in abundance of the offspring after 1987, which comes to show that the natural reproduction of the whiting was seriously disturbed between 1987-1989.The reasons for that are complex and are related to the significant alterations of the environment-the "blooms" of the phytoplancton was more frequent and more extensive,leading to considerable plague of benthonic and dimersal fishes and invertebrate fauna (Moncheva, Petrova-Karadjova, Palasov,1993). The food supply of the larvae and young fish was also subjected to rapid variations connected with the overall changes of the environment as well as with the mass development of the new ctenophore Mnemia mccradyi (Konsuloff,Konsulova,1993),

which appears to be vigorous competitor in ralation to the small-size crustaceans from Copepoda and also presents itself as a predator on eggs and fish larvae (Zaika,Sergeeva,1990).

Table 1

Initial (calculated by VPA) and mean biomasses (calculated by LCOHOR) of whiting along Bulgarian Black sea coast (1976-1993)

Years	*B_{1-4+}	*F_{1-4+}	**B_{10-18+}	**F_{10-18+}
1976	27273.6	0.0628	12652.2	0.0997
1977	25281.6	0.0797		
1978	25234.4	0.1219	16072.3	0.1161
1979	25104.2	0.1157		
1980	21610.6	0.2451	12441.1	0.1946
1981	17861.1	0.2284		
1982	15693.3	0.2703	10415.6	0.1945
1983	13469.7	0.1545		
1984	14687.6	0.1497	10568.9	0.1557
1985	14632.4	0.1324		
1986	13967.5	0.1137	6886.1	0.1511
1987	12760.9	0.1314		
1988	10893.4	0.1230	6343.2	0.1245
1989	12100.6	0.0765		
1990	14543.4	0.0253	2554.1	0.1113
1991	15399.6	0.0206		
1992	15123.8	0.0427	6397.7	0.0690
1993	12813.5	0.0657		

*B_{1-4+}-amount of the initial biomasses of the age groups from 1 to 4+ years old (in tons)

**B_{10-18+}-amount of the mean biomasses of length classes 10-18+ cm (in tons)

*F_{1-4+}-the mean value of fishing mortality for age groups from 1 to 4+ years old

**F_{10-18+}- the mean value of fishing mortality for length classes from 10 to 18+ cm

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