

This paper not to be cited without prior reference to the author

International Council for
the Exploration of the Sea

C.M. 1975/P:8
Baltic Fish Committee

On the total mortality rate of spring spawning
herring of the Northwestern Baltic

by

O. Rechlin

Institute for Deep Sea Fisheries and Fish
Processing, Rostock, German Democratic Republic

Since the early sixties the pelagic trawl has been using for herring fishery in the Baltic Sea.

Whereas the herring was caught mainly on its spawning grounds and in the spawning time before the introduction of pelagic trawl now the herring fishery runs all over the year and on all the Baltic areas. So we can conclude that all the different Baltic herring stocks are exploited by the fishery now. In connection with the decline of the North Sea trawl herring fishery the exploitation of Baltic Sea herring stocks increased significantly since the middle of the sixties.

Investigations of age and racial composition of herring catches showed more or less long termed natural caused changes of stock size of the different herring populations. The increasing fishery is influencing the stocks more and more shown by some investigations of mortality e.g. by Ojaveer (1974).

In connection with the lack of longer termed and differentiated statistics and dates of age composition of the different herring stocks we can estimate the mortality rate only step by step as all the other population parameters, too.

During the feeding period of herring from June/July to September/October a herring fishery season takes place in the areas 25 and 26. The catches of this fishery are mixed by spring spawning herring as well as from northern as from southern types and by autumn spawners, especially in area 25.

The portion of autumn spawning herring decreased strongly since the late sixties and actually the basis of the catches are spring spawners of the northern type immigrating for feeding into the southern Baltic in summer. The vessels of GDR are fishing in this season without exception by pelagic trawls. Using the method by CHAPMAN and ROBSON (1960) we calculated the total mortality rate of northern spring spawning herring in the area 25 from age composition of commercial catches of some years. The determination of races or types of herring was made by means of otoliths.

The method used for calculation of mortality rate determines the mortality coefficient from the fully recruited year class onwards. The method assumes a constant survival and recruitment.

Table 1 Total mortality rate Z of northern spring spawning herring in area 25

<u>Year</u>	<u>Z</u>	<u>age groups</u>
1967	1.14	9 and older
1968	1.56	9 and older
1970	0.42	4 and older
1971	0.59	5 and older

Since the early seventies the herring fishery has been increasing in the northern parts of the Baltic Proper where several groups of spring spawners different in otolith types and in growth spawn more or less far from the coast. Because of the rocky bottom in the Northwestern Baltic only a pelagic trawl fishery is practicable. From 1972 we took samples of herring on RV-cruises in the spring-summer season in area 27.

Table 2 Total mortality rate Z of northern spring spawning herring in area 27

<u>North of Oland</u>			<u>East of Stockholm</u>		
<u>year</u>	<u>Z</u>	<u>age group</u>	<u>year</u>	<u>Z</u>	<u>age group</u>
1972	0.87	6 and older	1972	0.84	7 and older
1973	0.82	7 and older	1973	1.74	6 and older
1974	0.42	2 and older	1974	0.42	2 and older
1972-	1.00	5 and older	1972-	0.97	6 and older
1974			1974		

Owing to the uncertainties in the method used, caused by the strong fluctuations in recruitment the calculated values have a tentative character.

However some conclusions seem to be possible. The total mortality rate calculated for area 25 for 1967 and 1968 are values of a relative unexploited stock. It seems these values could give an impression of M of Higher age groups. But on the other hand all the mortality values for area 25 are influenced by the feeding immigration of adult northern spring spawning herring stock shown by tagging results of Otterlind (1960). Both the increasing fishery and - with restriction - the rejuvenescence of fully recruited age groups point to an increasing total mortality rate of northern spring spawning herring.

References:

- Chapman, D.C. and Robson, D. The analyses of a catch curve
Biometrics, 16 (1960), pp.
354-368
- Otterlind, G. On the migration of the Baltic
herring
ICES, C.M. 1961, Herring Cte.
No. 121
- Ojaveer, E. On mortality rates of the
herring seasonal races in the
northeastern Baltic
Rapp. Proc. Verb., Vol. 166,
Cod and herring in the Baltic,
May 1974, pp. 140-145