International Council for the Exploration of the Sea

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Report on the Special Meeting on Cod and Herring in the Baltic

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J. Popiel (Herring)

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The Meeting which was arranged in accordance with C.Res. 1970/2:1, was held in Helsinki on 23 and 24 September (Cod) and 25 September (Herring).

The President opened the Meeting.

COD SECTION

There were 16 contributions to the meeting on cod, which were dealt with in three groups:

1.1 Investigations on Spawning, Feeding and Dynamics of Blood Serum

Two papers dealt with egg production outlining the distribution pattern of cod eggs in the spawning area and showing that the eggs seemed to be concentrated in a fairly narrow layer over the halocline.

It was indicated that year-class strength is determined in the embryonic stages, the mortality up to that stage apparently being strongly affected by the hydrographical conditions.

The meeting noted the need for coordination of egg and larval surveys and of intercalibration and standardisation of sampling techniques. Accordingly Recommendation 6 was passed.

A contribution on feeding indicated that the species composition of the food of cod changes with size of the fish, so that the quantity of Cyprina sp. and fish increases with size while the quantity of crustacea decreases. It further showed in November and March a dawn and dusk rhythm in the feeding time.

1.2 Tagging Experiments

Four papers on tagging experiments were considered. Substantial differences have been shown in the recapture percentage of different tag types, the spaghetti tag giving the highest recapture rate.

It was noted that the recapture rate in relation to total catches shows essential differences between countries. Accordingly the meeting passed Recommendation 2.

The tagging experiments indicated an overall mixing of cod in the Baltic proper.

1.3 Population Dynamics

Eight contributions dealing with population dynamics and related items were read, and the Meeting considered the following topics.

1.3.1 Separation of Stocks

The meeting, considering the question of unit stocks, noted that tagging experiments as well as blood and serum investigations show that the Baltic cod (Gadus morhua calarias) is separated from the Belt Sea cod (Gadus morhua morhua) by a border region west of Bornholm in the Arkona Basin. Cod from the Bornholm Basin and cod east and north hereof as far as in the Bothnian Sea intermingle to a considerable extent, with the area east of Bornholm being an important spawning place for all regions. However, distinct spawning groups do still exist. The meeting concluded that in the light of the strong mixing between all areas and in the absence of detailed catch and effort statistics for each of the regions separately, cod east of Bornholm may be considered as a unit stock.

The meeting stressed that studies of stock separation should be continued and that different biochemical and other methods be applied.

1.3.2 Catch and Effort

The meeting discussed whether the increase in the total yield in Division IIId between the thirties and the early fifties is likely to be due to an increase in effort.

It was noted that very few effort data are available and that there is an urgent need for abundance and effort data for mortality estimates. Some series of data are known to have been collected in the past, the meeting stressed that they should be made available and passed Recommendation 3.

It was realized that abundance data may be affected by low oxygen supply to the bottom layers. Nevertheless, collections of data are advisable as periods with no oxygen deficit are known to occur.

1.3.3 Age and Growth

The meeting concluded that data for estimation of mortality and growth parameters are either not available or not sufficiently reliable. The main reason for this is difficulties in interpretation of otoliths. The meeting decided that this problem was one of the first to be considered by the Working Group of Cod Assessment in the Baltic (see Recommendation 1.a).

The attention was drawn to new photometric techniques used for otoliths' readings in several countries. The mean age for recruitment to the fishery as well as the mesh sizes used in the Baltic cod fishery are not known either. The meeting passed Recommendation 4.

1.3.4 Mortality Estimates

It was agreed that several independent estimates of mortality rates were needed. The virtual population technique and data from tagging experiments were mentioned as possible ways.

1.3.5 State of Exploitation

The meeting was not able to reach a conclusion with regard to the present state of exploitation of the Baltic cod. The attempts which hitherto have been made to estimate parameters needed for stock assessments are highly inaccurate mainly due to lack of information on fishery and stock composition.

It was noted, however, that in view of the fact that no coordinated regulation system is in force in the Baltic, and the fact that other north-east Atlantic fishing areas are becoming still more extensively regulated, which bring about movements of effort, it seems necessary to consider regulations of the fishery in the Baltic.

The Meeting stressed the urgent need for provision of data necessary for stock assessments, which could form a sound scientific basis for possible regulations of the Baltic cod fishery. Recommendation 1 was passed.

Recommendations

The Special Meeting on Cod and Herring in the Baltic recommends that:

1. Noting that attempts to carry out assessments of Baltic cod stocks have been seriously hampered by the lack of data, particularly effort and age composition data, the Working Group on Cod Assessments in the Baltic should meet before the 1972 Statutory Meeting of ICES in order to:

   (a) compare age determination techniques,

   (b) discuss ways and means by which further data necessary for stock assessments can be made available,

   (c) to evaluate the state of the stock and its exploitation on the basis of the data available.

2. Taking into consideration that several tagging experiments on Baltic cod have revealed substantial differences in the rate of reporting of recaptured fish by different countries, these be urged to improve their reporting procedure.

3.1 Noting that very few effort data for Baltic cod fisheries are published, any existing catch and effort data for past years be made available to the Working Group which should consider the possible publication of these data in the "Statistical News Letters".

3.2 Countries fishing in the Baltic be urged to compile catch and effort data in future years for publication in the "Statistical News Letters".

4. Considering the fact that the minimum legal mesh sizes enforced by countries fishing in the Baltic varies between countries, and noting that very little information about mesh sizes in use is available, member countries should be urged to provide such data for assessment purposes, and to carry out selectivity experiments.

5. Selected papers and proceedings of the Special Meeting on "Cod and Herring in the Baltic" be published in a special volume of the "Rapports et Procès-Verbaux" with Dr. O Bagge as Editor.

6.1 Member States bordering the Baltic should be urged to intensify and coordinate their surveys of eggs and larvae of cod.

In order to achieve a reliable picture on the annual changes of the spawning intensity of Baltic cod all major spawning areas should be sampled on at least monthly basis.

For studies on the mortality of eggs and larvae selected areas should be sampled weekly or bi-weekly for short periods. Those studies might be linked with analyses of the relationship between the physiological condition of the parent stock and the size and chemical composition of the eggs.

6.2 Dr O Bagge should initiate correspondance concerning intercalibration and standardisation of sampling gear and sampling techniques for egg and larval studies.

HERRING SECTION

Three papers on general biological items were presented and discussed.

2.1 Condition

It was noted that younger herring seem to be less affected by the spawning than older fish and do recover faster. This might be connected with the fact that the egg mass relative to the total body weight is higher for older than for younger fish.

2.2 Larval Biology

The contribution on larval biology showed that during daytime the vertical distribution of the larvae was affected by light condition. A striking feature was the good filling of the stomach in contrast to what has been found for larvae in the North Sea.

2.3 Stock Separation

It was demonstrated that serological analyses may be a useful method to distinguish between Baltic herring populations. Significant differences were shown in geographically well separated stocks.

The Meeting passed Recommendation 1.

Five papers dealt with different aspects of stock and fishery.

2.4 Catch and Effort

The papers discussed indicated a general increase in the fishing effort and catches after 1966. In 1968 a substantial increase in the Swedish catches caused by the shifting of North Sea effort into the Baltic was observed. However, the catch and effort declined again to the former level.

In order to be able to follow the development of the exploitation, the reporting of catch and effort data was discussed. It was agreed that a break down of the data in time and area was needed, and the Meeting accordingly passed Recommendations 3 and 4.

2.5 Mortality

Very few data on mortality of the different stocks in the Baltic were available. Only in the north-eastern part of the Baltic estimates of mortality have been made in a more extensive way.

2.6 Recruitment

It was reported that inflow of water with high salinity into the Baltic has a great influence on the generation of strong year classes of spring- as well as autumn-spawning herring. Apparently this improves the feeding conditions of the herring larvae and the 0-group herring. It was noted that in order to be able to estimate the abundance of herring in the different nursery areas, larval and young herring surveys are needed. Recommendation 5 was passed.

2.7 Stock Assessments

From the discussions it appeared that a considerable part of the catch might not be covered by adequate sampling. In order to be in the position to carry out a stock assessment, sampling of the Baltic herring fishery has to be improved. The meeting passed Recommendation 2.

2.8 Prediction of Catches

A method for prediction of the yield based on catches of small-sized herring were presented. The meeting stressed the need for further investigations in this field.

2.9 Conclusions

As a result of the general discussion the meeting agreed on the following conclusions:-

a. The Special Meeting wishes to express a growing concern about the state of the Baltic Herring Stock due to the increased rate of exploitation.

b. In order to make a stock assessment more adequate, catch, effort and biological data are required than are available at present.

c. The meeting is of the opinion that a better coordination of the existing regulatory measures of the different countries fishing in the Baltic would improve the effect of these measures.

Recommendations

The Special Meeting on Cod and Herring in the Baltic recommends that:-

1. bearing in mind the existence of several herring stocks in the Baltic which are not well defined further studies in this field ought to be made.

2. recognizing the need for age composition and weight date for stock assessments, it is stressed that all important fisheries should be adequately covered by sampling programmes, and that the data be published in the "Statistical News Letters".

3. For an evaluation of the state of exploitation of the different herring stocks in the Baltic, detailed statistics on catch and effort on a monthly basis and by an agreed area subdivision are needed, and should be published annually in the "Statistical News Letters".

4. Due to the existence of several separate stocks in the Baltic, a group of experts, working by correspondance, should prepare a joint report tabulating and charting the different stocks, and making a proposal for the grouping of these. The experts should at the same time consider how to subdivide the Baltic for compilation of detailed data on catch and effort, and present their results to the Pelagic Fish (Northern) Committee at its meeting in 1972. Professor J. Popiel should convene the work.

5. In order to have an independent estimate of the abundance of the separate spawning stocks and the abundance of 0-group herring, larval and young herring surveys with standard gear be encouraged.