

A Note on the Estimation of Brood-Strength in Arctic  
Cod and Haddock.

By

G. Sætersdal.

In the Arctic cod and haddock the natural fluctuations of the abundance of the stocks are very marked and have a great influence on the yield of the various fisheries. It is therefore important to be able to give reliable forecasts of these fluctuations.

In Norway, we have for a number of years tried to forecast the abundance of the stock of skrei (mature cod, abt. 8-12 years of age). These prognoses have partly been based on observations of our fishery for the young immature cod (5-8 years of age) on the Finnmark coast.

Attempts have also been made to measure the abundance of the yearclasses at a much earlier stage viz. by series of observations of the density of 0-group cod and 0-III - group haddock in some fiords in North Norway. The gears used in these investigations were shrimp-trawl and beach-seine, and the observations were made during two months research vessels cruises in autumn and cover the years 1945-56. The results appeared, however, to be of little or no value for evaluating the brood-strength of higher age-groups.

The details of some Soviet-Russian investigations of the abundance of young age groups of cod and haddock in the Barents Sea have lately been published, BARANENKOVA 1957 and 1958. A comparison of these results with our observations of brood-strength on higher age groups is of great interest. In table 1 is listed the available data for the arctic cod. BARANENKOVA's basic data includes observations of the age groups 0-IV, but the author claims that the most reliable estimates are obtained from the I and II group fish. BARANENKOVA's data refer to mean number of specimens per hour's trawling. The Norwegian data are arbitrary indices of relative abundance based on age observations and measures of apparent abundance of the fish in the various years. (In the Finnmark fishery this measure is yield per vessel over the whole season; in Lofoten mean yield per gill-net-vessel per week has been used). These three measures of abundance are not directly comparable, but a certain basis for comparison is obtained by using one of the yearclasses as a standard. In this case the yearclass 1948 was chosen because it appeared to be of medium strength in all three series. Thus in table 1, the Lofoten and Finnmark data have been recalculated according to value given to the 1948 yearclass.

There is seen to a fair agreement of the general features of the three independent sets of observations. The most serious discrepancy is probably that between the Soviet-Russian estimate of the 1950 yearclass and that from the Finnmark fishery. We are, however, aware that the Norwegian data are in many ways inadequate, both because of errors of observation and because <sup>of</sup> the significant variations in the availability of the fish which we know has taken place in later years in this fishery.

A similar comparison for Arctic haddock is shown in table 2. Even if there are also here some rather serious discrepancies the main features are the same in these indeed very drastic fluctuations.

There is thus no doubt that the observations of the density of the lowest age groups of Arctic cod and haddock can be of great help in forecasting the fluctuations in the fishable part of the stocks. It is therefore with pleasure we have learnt from PINRO in Murmansk that these investigations will be continued and even intensified in the coming years.

References:

- BARANENKOVA, A. S., 1957. Comparative abundance of yearclasses of cod and haddock in the Barents Sea according to the quantitative estimation of the young fish and the data of fisheries. TRUDY, PINRO X, Moscow.
- BARANENKOVA, A. S., 1958. Works of PINRO on the study of distribution of young cod and haddock and quantitative estimation thereof in the Barents Sea. Paper presented at the joint Soviet-Russian and Norwegian meeting in Murmansk, August 1958.

Table 1. Estimated relative abundance of recent yearclasses of Arctic cod. Comparison of data is based on equal strength of the 1948-brood. Barents Sea data from BARANENKOVA 1957 and 1958.

Lofoten			
Age-gr. VIII			
- XI.			
		Finnm. Age	Barents Sea
		gr. V-VIII.	No/hr.'s trawling
			Age gr. I-II.
1937	89		
38	18		
39	9		
1940	9		
41	20		
42	29		
43	28	24	
44	13	12	14
1945	11	10	6
46	10	19	5
47	14	19	17
48	25	25	25
49		23	24
1950		46	82
51			13
52			2
53			11
54			10
1955			4

Table 2. Estimated relative abundance of recent yearclasses of Arctic haddock. Comparison of data based on equal strength of the 1949-brood. Barents Sea data from BARANENKOVA 1957 and 1958.

	Finnm. Age	Barents Sea
	gr. IV-VII	No/hr.'s trawling
		Age gr. I-II
1945	7	
46	10	1
47	9	1
48	92	30
49	7	7
1950	295	256
51	7	15