

Peculiarities in Distribution of Cod in the Southern Barents Sea (Area I) in 1961

by

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As is well-known, migration paths of "loddetorsk" moving to the coast in spring greatly vary from year to year. In spring 1961, "loddetorsk" migrated mainly to the Norwegian Coast having hardly appeared in the coastal zone to the east of the Varangerfjord. Therefore, the Finmarken Bank and the Norwegian Channel were of the greatest importance to the Murman trawling-fleet in March/April. For example, in April the Murman trawling-fleet obtained 84% of the total catch there taken in the southern Barents Sea. It may be mentioned that in the same month in the west-coastal area, Kildin and Rybachya Banks only about 3% was taken of the total catch of the Murman trawling-fleet obtained in the southern Barents Sea.

Western location of migration paths of "loddetorsk" in 1961 was expected by Soviet biologists and fishermen. Long-term observations revealed a close agreement between the spring migrations of cod and the water temperature observed in the last quarter of the previous year (especially in November and December).

Anomaly of temperature  $-0.27^{\circ}\text{C}$  was observed on the Kola hydrological section in November 1960, while in December it was  $-0.30^{\circ}\text{C}$ . Thus making it possible, at the very beginning of 1961, to forecast migration paths of "loddetorsk". As "loddetorsk" and capelin move together in the winter/spring period, the forecast also applied to capelin arrival in the coastal waters. In January/February, the reliability of this forecast was reaffirmed by direct observations on the movement of capelin and "loddetorsk". Scientific workers of the PINRO could foresee that in spring 1961, the fishery for these species near the Norwegian coast would be very good.

The above regularity also allowed us to forecast the arrival of "loddetorsk" and capelin in the coastal waters for spring 1962.

Regular hydrological observations showed that in the Kola section positive anomaly in November, 1961 remained at,  $+0.23^{\circ}\text{C}$ , and in December at  $+0.20^{\circ}\text{C}$ . Therefore, we had every reason to expect the arrival of capelin and "loddetorsk" in spring 1962 in the inshore waters of the east Murman coast, and this actually happened.

The analysis of long-term data allows us to have the empirical formula:

$$y = 24.8x + 20.5$$

where  $x$  is an anomaly of temperature in the Kola section in October/December, and  $y$  is the commercial importance of the coastal zone (approximately from the Varanger Peninsula to the Kharlov Island) expressed as a percentage of the total catch in the southern part of the Barents Sea in March/April. During 15 post-war years this value amounted on an average to 18%.

Mass migration eastwards of immature cod usually begins in May. They can move by two routes: 1. across the Murman Bank, northern slope of the Murman Shallows, north-central area and Goose Bank, and 2. along the coast, from the Varangerfjord to the Svjatoy Nos Cape. We managed to establish that the first route is taken by cod mainly in warm or temperate years (in hydrological respect), while the second route is taken in cold years. During the period from May to August, 1961, the thermal conditions of the southern Barents Sea gradually returned to the average long-term level. In accordance herewith and since June, paths of mass migration of cod had passed across the open sea areas. In July, cod reached the western slope of the Goose Bank and the fishing importance of that area increased to a greater extent.

The movement of cod mainly by the "northern" route determined their mass return run across the central areas in November/December. At that time Soviet fishing trawlers operated mainly on the Goose Bank, in the north-central area and on the northern slope of the Murman Shallows. For example, in December, 1961, 34.3% of the total catch obtained by the Murman trawling-fleet in the southern part of the Barents Sea was taken on the Goose Bank. The central areas were also of great importance to the Soviet trawl fishery in the second half of the winter up to March, 1962.

I would like to mention one more peculiarity of cod distribution closely connected with the temperature conditions. As shown by observations in the hydrological section, North Cape-Bear Island, the northern branch of the North Cape Current was intensified in the summer of 1961. In accordance herewith the fishing importance of the two areas washed by the northern branch (the Demidov Bank and the Central Elevation) increased to a greater extent. In September/November, 1961, the Central Elevation won such a great fishing importance which it had not had since the autumn of 1957, when the northern branch of the North Cape Current was also intensified.