

Comparative Study of the Intensity of Feeding of Cod (*Gadus morhua*) off Newfoundland and of the Southern Barents Sea*

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Abstract

In stocks experiencing intensive fisheries, the quantitative assessment of food consumption is important in understanding the trophic interrelationships. As an example it has been reported that exploitation of the planktophage capelin stock in the Barents Sea resulted in the loss of the stable food base of the Arcto-Norwegian cod. The period of the sharpest decline in capelin abundance (1987-88) was followed by transition of food consumption of cod to the young of commercial fish and other small non-commercial fish and crustaceans. Consequently, changes were noted in some biological conditions of cod (Orlova *et al.*, 1990a).

Food consumption investigations formed the basis for the construction of multi-type models in this study. The Arcto-Norwegian cod distribution is close to that of the Newfoundland cod, and hence similarities in rate of growth and sexual maturing, and also hydrological conditions and food composition, with the exception of sand eel (*Ammodytes* sp.), are known (Popova, 1962; Turuk, 1973, 1976; Lilly, 1987). This permitted the comparison of the intensity of feeding of cod of both stocks. A comparative analysis of the results of calculations of daily rations of the Atlantic cod (*Gadus morhua*) is presented in this paper.

Data on food consumption of the Newfoundland cod according to materials by Popova (1962) and Turuk (1976), with a subsequent recalculation of daily rations based on stomach content data, were used in the calculations. Indices of stomach fullness of cod of different size groups feeding on capelin and sand eel in the southern coastal areas of Newfoundland in the summers of 1959 and 1960, as well as those feeding on sand eel in the Grand Banks in December 1964 were used. Data on quantitative analysis of stomach content were used in a number of previously developed models of calculations of daily rations of cod (Baikov, 1935; Zalachowski, 1985; Orlova *et al.*, 1990b; Bogstad and Mehl, MS 1991).

In 1960, in the period when cod was mainly feeding on sand eel, the indices of stomach fullness were lower than those when feeding on capelin; the daily rations did not exceed 1-2%. In 1964 the indices were highest, maximum daily ration values of 2.8-3.1% were noted for cod of 51-70 cm. Feeding was fairly intensive and stable on the Newfoundland Bank, and the indices of cod fatness were in good agreement with the daily rations. In the calculations of daily rations of the Arcto-Norwegian cod made using all the above methods, for the period when it was mainly feeding on capelin, turned out to be very close with the daily rations not exceeding 2-3%.

The sharply increased volume of quantitative information in recent years, particularly for Atlantic cod makes it possible to have a unified approach of calculation of daily rations.

Key words: Barents Sea, cod, *Gadus morhua*, food and feeding, Newfoundland Bank

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