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Length-age Composition of Benthosema glaciale (Myctophidae) from the southern slope of the Grand Bank

by

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ABSTRACT

The dynamics of the length-age composition of B.glaciale population by months from the data for 1982 to 1985 is discussed. Fish at an age of 3 and 4 years with the average length from 5.2 to 6.3 cm were found to comprise the bulk of catches irrespective of the season.

INTRODUCTION

Benthosema glaciale (Reinhardt, 1837) is the most common and abundant member of the Myctophidae in the North Atlantic. It inhabits the area north of 35°N and is occasionally found as far as 80°N.

Rather a full account of different aspects in the life cycle of this myctophid fish was given by Gjøsaeter (Gjøsaeter, 1970, 1981) as a result of his studies into B. glaciale in some fjords of the Western Norway, and off the Nova Scotia by Halliday (Halliday, 1970).

B. glaciale is a typical non-active myctophid fish (Bekker, 1983). Moving passively with the flow the fish depend fully on water dynamics and do not form spawning and feeding concentrations. Various conditions under which some B. glaciale transported by water drift onto the Grand Bank slopes developed determine the diversity of otoliths revealed during age reading. The obtained results confirm the data from literature stating that specimens from different geographical areas may have diffe-

rent structures of zone formation, and there may be variations even within the area (Gjøsaeter, 1981). The length and age composition of B. glaciale from the Grand Bank outside the 200-mile zone is analysed (Fig. 1). The paper aims at determining the importance of different length-age groups for the formation of B. glaciale population on the southern slope of the Grand Bank.

MATERIAL AND METHODS

The paper is based on the results of investigations performed by research ships with the aim to study the distribution and biology of mesopelagic fishes in the oceanic areas of the North Atlantic. A pelagic trawl with a fine (12 mm) meshed netting in the codend was employed.

The standard length (from the tip of the snout to the end of the middle rays of the tail fin) accurate within 1 mm was taken. Age was determined by means of otoliths viewed by binocular microscope using the reflected light.

The data on the age composition are substantiated by the length frequency curves plotted using a voluminous material of B. glaciale mass measurements. Specimens 3.2 to 7.8 cm long were found in the catches. The average length ranged from 5.1 to 5.9 cm in males and from 5.1 to 6.0 cm in females. The linear growth rate of B. glaciale is shown in Table 1.

Table 1. Linear growth rate of B. glaciale in the Grand Bank area (cm).

Sex	Age 1	2	3	4
Males	4.2 ± 0.33	5.3 ± 0.06	5.8 ± 0.07	6.2 ± 0.15
Females	4.5 ± 0.12	5.3 ± 0.07	5.9 ± 0.09	6.5 ± 0.17

Our data indicate that B. glaciale females are somewhat larger than males of the same age.

The number of males in the catches taken nearly in all periods was a little higher than that of females; their portion ranged from 53.5% to 64% of the fish analysed.

The material was collected in different months of 1982 to 1985 which, as a result, permitted us to complete the yearly cycle of observations over the length-age structure of B. glaciale in this area.

RESULTS AND DISCUSSION

The results of the length-age structure analysis are indicative of a low dynamics of the length-age composition in B. glaciale catches throughout the year.

According to our data, B. glaciale in the Grand Bank area may attain the age of 5 years. In the samples taken in different seasons fish aged 2 to 5 years were available (Fig. 2). The lack of yearlings and an insignificant amount of 2-year-old fish speak, to our mind, of the trawl selectivity as well as of a high susceptibility of B. glaciale, especially, the young fish, to damages, that is why the least damaged specimens of a large size were chosen for analysis.

The results of ichthyoplankton investigations show the presence of B. glaciale larvae and fry in this area (PINRO data).

The material obtained for several years testifies that, remaining almost unaffected by months, the significance of the fish aged 3 and 4 years is still dominating in the formation of fishing concentrations in this area. The ratio of 3- and 4-year-old fish varies in the catches irrespective of the season. The specific weight of fish aged 3 ranged in different months from 14 to 52 %, that of 4-year-olds - from 17 to 70%. The number of fish aged 5 was no higher than 17% in our samples.

CONCLUSIONS

1. B. glaciale concentrations in the Grand Bank area are formed by fish from different length-age groups (aged 2 to 5 years 3.2 to 7.8 cm long, according to our data).

2. Fish aged 3 and 4 years with the average length 5.3 to 5.9 cm are the most abundant in the catches irrespective of the season.

3. Females in the samples are relatively larger than males of the same age.

4. The portion of males in the catches is somewhat higher than that of females.

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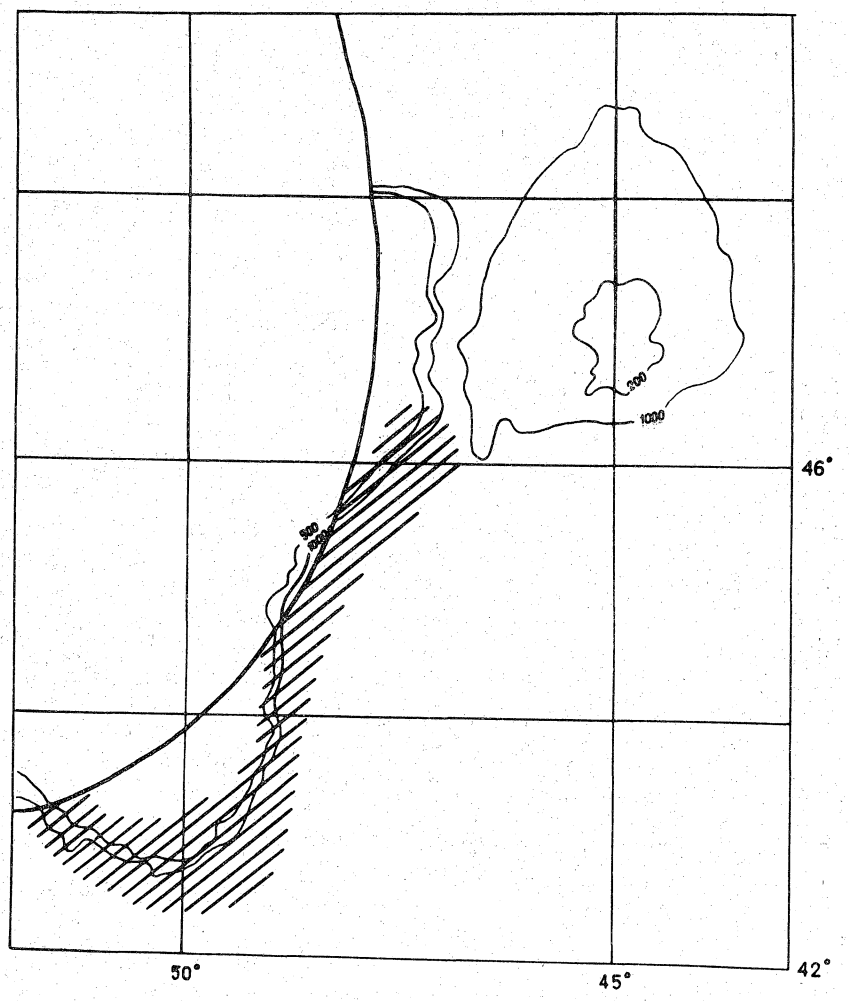

Fig. 1. Area of B. glaciale survey in 1982-1985.

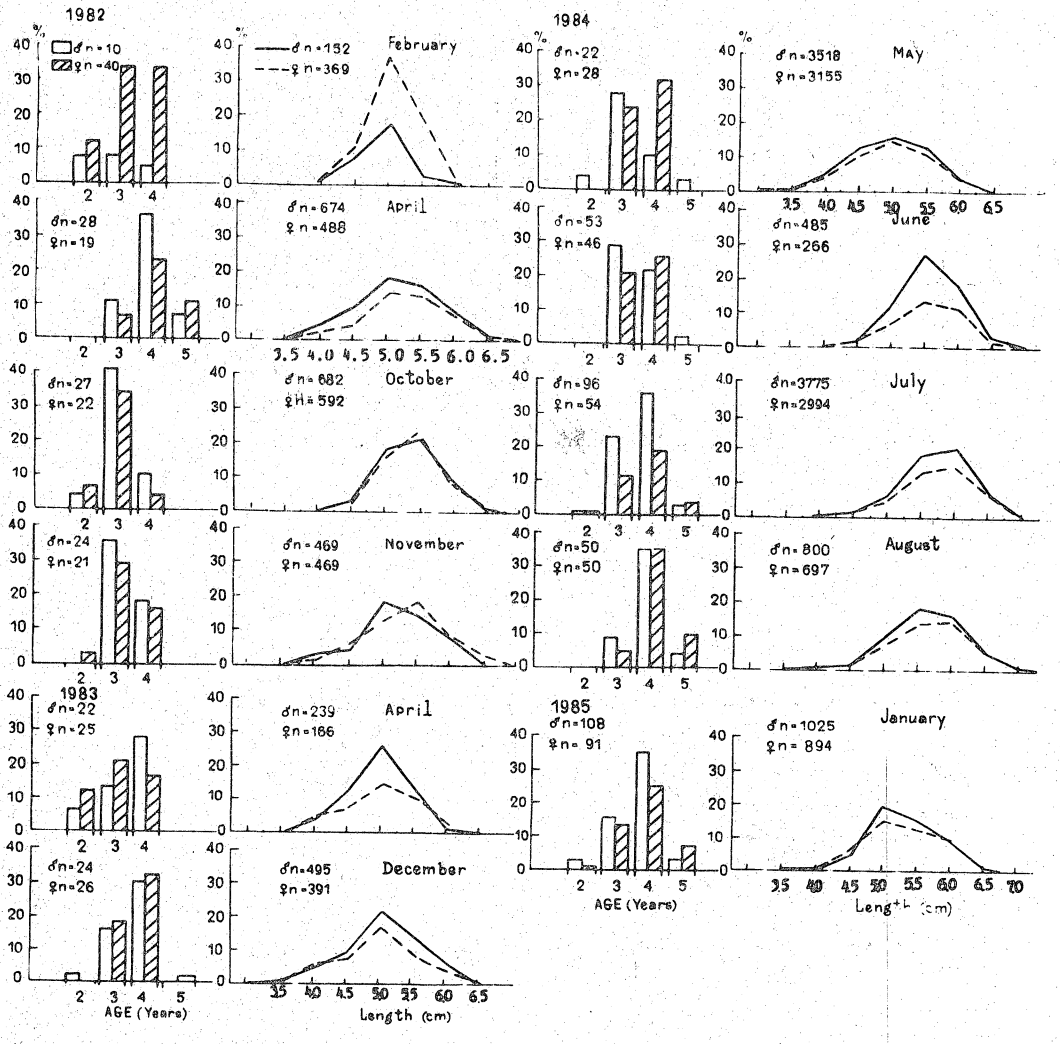

Fig. 2. Length-age composition of B. glaciale from the Grand Bank in 1982-1985.