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Document No. 62ANNUAL MEETING - JUNE 1964Plankton Investigations in the Areas of Georges and Browns Bank in 1963

by Ju. A. Chernov
ATLANTNIRO
USSR

In 1963 Atlantic Research Institute carried out plankton studies in the waters of Georges and Browns Banks (Divisions 5 Z and 4 X).

From April to August 123 stations were made and 334 samples of plankton were taken. In April and May samples were taken along the slopes of Georges Bank. During the summer season two routine surveys were made (Fig. 1), the first from 1 to 8 June, the second from 1 to 8 August.

Plankton was taken with Judy No. 38 silk net (37 cm opening).

Samples were taken from standard layers : 0-25, 25-50, 50-100, 100-200 m. Planktonic collections were combined with hydrologic and ichthyologic observations. Quantity and quality compositions of phytoplankton were determined on the basis of net hauls. The quantity values were expressed subjectively : by single numbers, tens, hundreds, etc. of cells within the sight of binocular (object - glass 4 x, ocular 8).

Spring season (April - May, Subarea 5)

In April - May along southern and south-western slopes of the Georges Bank were warm waters with temperatures 6 to 14°C. The qualitatively most various phyto and zooplankton was observed in this area.

Phytoplankton included such forms as peridineaes (Ceratium tripos, C. fusus, Peridinium sp. etc) and diatomaceous (Coscinodiscus spp., Chaetocers spp., Rhizosol. sp.). Their number was expressed by number of cells in the field of vision.

Phytoplankton included also some species of tropical fauna (Rhincalanus nasatus, Candacia armata, Salpa fusiformis etc.) which occurred in samples only as individuals. Boreal organisms, such as Calanus finmarchicus of II-V Copepoda stages (mainly III-IV), Pseudocalanus elongatus, Oithona similis, Limacina retroversa, Oicopleura sp., Larvae Euphausiacea and Themisto constituted the bulk of zooplankton biomass.

Great number of nauplii stages is indicative of the spawning of Copepoda that was taking place there.

The biomass of seston was 700-1200 mg/m³. In April - May the northern and northeast slopes of Georges Bank were characterized by cold waters (5°- 6°C) and the biomass of seston was 500- 1000 mg/ m³. Number of phytoplankton amounted to several hundreds, sometimes to thousands cells in the field of vision. Peridineae were in majority (Ceratium tripos, C. fusus, Peridinium sp.) while Diatomeae were represented in samples only by individual specimens of Coscinodiscus sp. and Podozira sp. Calanus finmarchicus and Metridia longa of copep. stages V-VI were fully represented in the layer 80 to 200 m. Calanus finmarchicus (copep. stages II-III, Pseudocal. elongatus, Oithona similis were dominating in the upper layer of water. No sizable vertical migrations were observed. Such distribution of zooplankton may have been caused by an inflow of cold water of the Labrador Current into this part of Georges Bank. Spawning of Copepoda and Euphausiacea was also observed here.

Summer season (June, August,
divisions 5Z and 4X)

Early in June a mass development of Peridineae was observed in the waters of Georges and Browns Banks. By the intensity of their development three zones can be distinguished (Fig.2). Early in August phytoplankton (hundreds of

cells in the field of vision) was met only on some stations in the south-western part of the Gulf of Maine. Biomass of seston on Georges Bank (except the southern slopes) was 1000 - 1800 mg/m³, and at some station in its western part - about 3300 mg/ m³. Biomass of seston of about 170-450 mg/m³ was observed on Browns Bank and on the southern slopes of Georges Bank (Fig.3). In August, an abundant biomass of 500- 1000 mg/m³ was found only on the northern slopes of Georges Bank (Fig.4). Zooplankton in the waters of the southern slopes of Georges and Browns Banks was represented by tropical forms, Metridia lucens and Oithona similis .

In the central part of Georges Bank the following mass species were observed : - Pseudocalanus elongatus, Oithona similis, Paracalanus parvus - in June , and - Centropages typicus, C. hamatus and Temora longicornis in August.

In June following zooplankton species dominated on the northern slopes of Georges Bank, in the Gulf of Maine and through the most part of Browns Bank: Calanus finmarchicus , Metridia longa, Pseudocalanus elongatus, Oithona similis and Limacina retroversa. In August Calanus finmarchicus and Limacina retroversa disappear from plankton, but Metridia lucens appear in large numbers. Euphausiacea were found all over the investigated area ; in June - July Meganictiphanes norvegica was abundant on Browns Bank.

In April - May an average number of planktonic organisms on Georges Bank slopes was 4000 - 7000 specimens in one cubic metre of water ; in June and August the greatest number of specimens (1800- 3200 specimens per m³) was observed along the northern and northwest slopes of Georges Bank.

In April- May Calanus finmarchicus constituted on the average about 33% of the total numerical strength of organisms ; in August from 18 to 33 %. Spawning of Calanus finmarchicus along the southern slopes of Georges Bank began in

February; on the eastern Georges Bank and on Browns Bank - one month later. In April- May and in May- June the second period of spawning of Calanus finmarchicus was observed.

Period of spawning of Pseudocal. elongatus were hard to distinguish, because of overlapping.

Obviously, the spawning period in the south and south-east part of Georges Bank began in March, whereas in the northern slopes it began 15-20 days later.

According to our data, periods of spawning and growth of Euphausiacea coincide in time with those for Calanus finmarchicus.

In comparison with 1962, the following peculiarities in seasonal development of phyto and zooplankton were observed in 1963 :

1. In May- June, 1963 phytoplankton was more abundant than in the same months in 1962.
2. In 1963, Peridineae dominated in the composition of phytoplankton. In 1962, Diatomeae prevailed in number.
3. During spring- summer season, 1963 biomass of seston was somewhat higher than during the same seasons in 1962.
4. Spawning of Calanus finmarchicus and Euphausiacea in 1963 began 10-15 days earlier than in 1962.

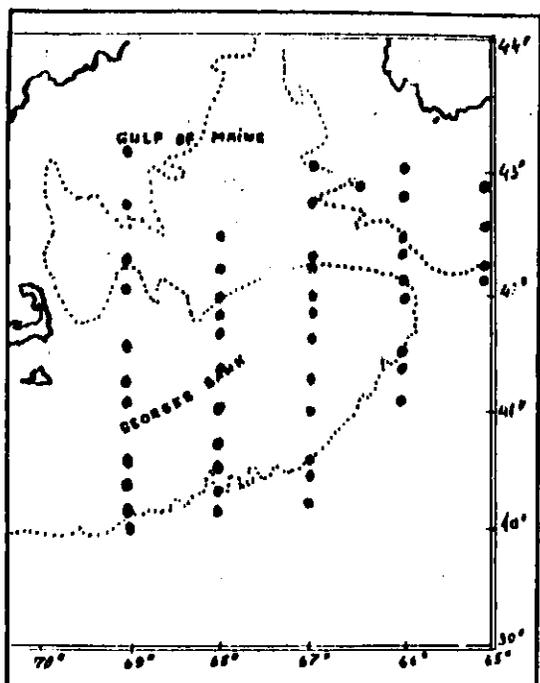


Fig. 1. Plankton stations in June and August.

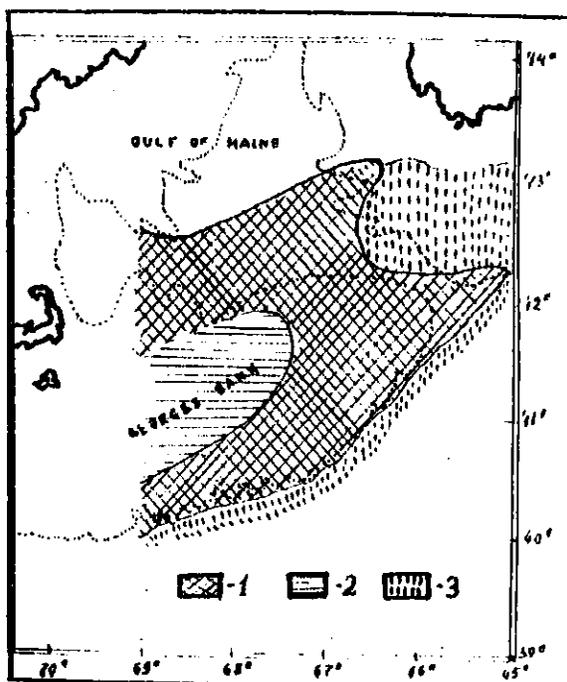


Fig. 2. Quantitative distribution of phytoplankton in the layer 0-25 m, June 1-8 1963.

Conventional symbols :

- 1 - Thousands and tens of thousands of cells in the field of vision.
- 2 - Tens and hundreds of cells in the field of vision.
- 3 - Single cells in the field of vision.

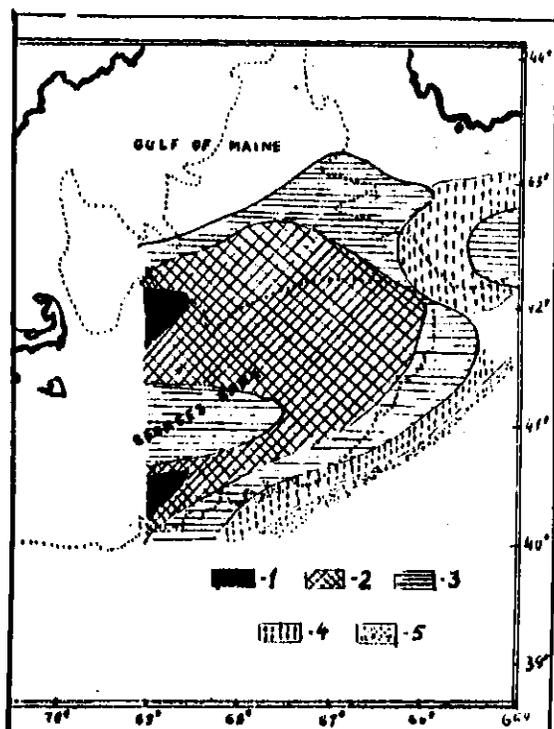


Fig. 3. Quantitative distribution of seston on Georges and Browns Banks in the layer 0-100 m June 1-8, 1963.

Conventional symbols :

- 1 - 2000 mg/m³ and more
- 2 - 1000 - 2000 mg/m³
- 3 - 500 - 1000 mg/m³
- 4 - 200 - 500 mg/m³
- 5 - 100 - 200 mg/m³

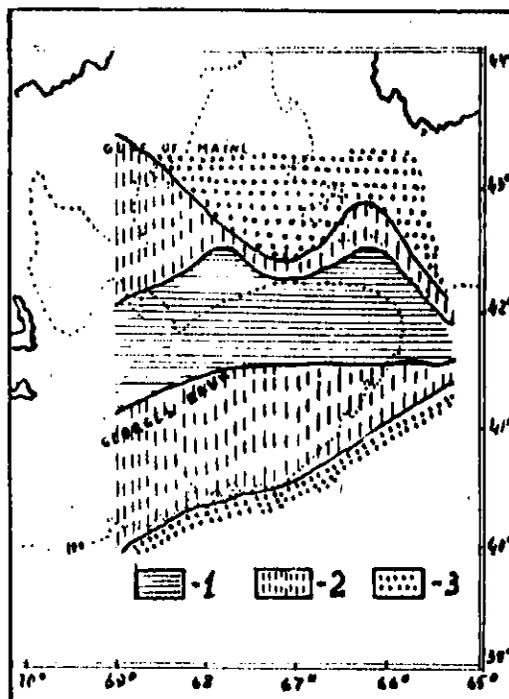


Fig. 4. Quantitative distribution of seston on Georges Bank, August 1-8, 1963.

Conventional symbols :

- 1 - 500 - 1000 mg/m³
- 2 - 200 - 500 mg/m³
- 3 - 50 - 200 mg/m³