

ANNUAL MEETING - JUNE 1965The Distribution of Pelagic Redfish Fry
in the East and West Greenland Areasby G.P. Zakharov
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It is a well-known fact that the waters off East and West Greenland are mainly inhabited by Sebastes marinus (L). At present redfish do not breed off West Greenland (Tåning, 1951; Travin *et al.*, 1961; Zadharov, 1962, a,b), while in the 1920's the breeding of redfish did take place there (Jensen, 1926; Tåning, 1948). Off East Greenland also only an insignificant number of redfish breed (Magnusson, 1959, 1961). The main breeding grounds of S. marinus (L) in the North Atlantic are located in the open areas off Southwest Iceland (Kotthaus, 1958; Magnusson, 1959). From there, redfish larvae drift in the stream of the warm Irminger current towards Greenland (Einarsson, 1960). Redfish resources in the Greenland waters are greatly dependent upon the number of fry carried there with the current (Tåning after Templeman, 1959). Therefore the study of the distribution and abundance of larvae and pelagic fry off East and West Greenland is of great importance.

In recent years extensive investigations have been carried out into the distribution and abundance of redfish larvae in the North Atlantic during the period from April to July (Einarsson, 1960; 1961; Henderson, 1961a, 1964, a,b; Hansen and Andersen, 1961; Glover, 1962; Kotthaus, 1961; Magnusson, 1962). We know much less about the occurrence of pelagic fry during later period.

In October 1913 off East Greenland in the Angmagssalik area, Jensen (1922) caught 127 small redfish, 29 - 45 mm long. In July-August in the upper water layers along the west side of Denmark Strait, Tåning (after Templeman, 1959) took, with a 2-m stramin net, thousands of redfish fry, 20 - 45 mm long. Einarsson (1960) gives two charts of the distribution of redfish larvae, with a mean length of 20 - 29 mm, which were taken by a stramin net off East Greenland in July and August.

Off West Greenland in September, young redfish 27 - 49 mm in length were often caught in the upper water layers (Jensen, 1922). Hansen (1953, 1957, 1958) states that in August 1930 off Southwest Greenland in the Julianehaab area a great deal of dead redfish were found drifting at the surface. Their mean length was 35.6 mm. In September 1951, in the same area (Julianehaab), redfish fry with a mean length of 43.6 mm were collected from cod stomachs (Hansen, 1957, 1958). Hansen thinks that the fry caught in August 1930 and September 1951 belonged to the 0-group. Tåning (after Templeman, 1959) informs that off southwest Greenland great numbers of rather large redfish fry are carried to the shore in autumn. In the Greenland fjords great masses of such drifting small redfish are carried to the shores and Greenlanders gather them.

Based on the materials collected by Jensen, Templeman (1959) came to the conclusion that in the Greenland waters young redfish up to 45 - 50 mm in length keep in the water layers. He explains this phenomenon by the fact that either young fish in the cold areas keep in the surface layers until they reach greater sizes or fry grow weaker in the cold water and cannot escape fishing gears.

From July to October, 1964, during the cruise of the R/V SEVASTOPOL, 55 hauls with a 20-m midwater trawl were made in the areas of East and West Greenland. A nylon 5-mm mesh net was inserted into the codend. All hauls were one hour long. The majority of hauls was performed beyond the slope in water 200 to 250 m deep. Figure 1 shows the distribution and abundance of redfish fry sampled off Greenland in July and September-October, 1964.

The first hauls were made on 20 July off East Greenland, 65°N, 33°W. In three catches made at 175 - 225 m, redfish fry 2.5 - 4.8 cm long (mode 3.5 cm) were found. On 20 July, east of the Bille Bank at 100 - 200 m, 100 fry 2.7 - 4.8 cm (mode 4.0 cm) in length were taken.

Later hauls made in the southward direction along Southeast Greenland gave no results though depths from 100 - 600 m were covered. Hauls performed 5 September off Baffin Island and on 11 September in Davis Strait about 65°N at 250 - 300 m were also blank.

Off West Greenland from 64°N to the south (15 - 26 September) scores and hundreds of redfish fry were found in almost every haul. Off East Greenland (27 September - 7 October) redfish fry were encountered everywhere to 65°N, 35°W. East of this place no fry were observed.

While approaching the slope the number of fry increased. Evidently, fry drifted mainly in the core of the warm Irminger current. To determine the layers at which redfish fry drift a series of hauls were made off South Greenland at 100, 200, 300 and 400 m. The bulk of fry were found to be drifting at 200 m (Table 1).

However, off East Greenland on the Bille Bank at a point where the depth was 200 m, in 2 hauls made at 70 and 100 m, 400 and 500 fry were taken. Probably the water flowing from the north ascended there to pass over the Bank and the fry appeared to be at shallower depths.

The sizes of redfish fry taken in September-October were 4.0 - 6.0 cm, the mode being at 5.0 cm. No difference was observed between the length of fry taken off West and East Greenland.

It was found that scales begin to form on redfish fry when they reach a length of 4.5 - 5.0 cm. The scales appear in the form of round tiny plates in the skin. A central plate with a single sclerite was found in a few specimens of the above-mentioned length. No rings were observed on the otoliths. Fry, 5.5 - 6.0 cm in length, had 5 - 7 wide sclerites on the scales. These fry were of age 0+. In a single redfish fry 7.2 cm in length, of orange colour, 6 - 8 sclerites were followed by 4 narrow sclerites followed in their turn by 7 wide sclerites. The age of this specimen was 1+.

The occurrence of redfish fry in the stomachs of cod taken off West Greenland from 1958 to 1964 gives some indication of how far northward redfish fry are carried with the current. The results are shown by months in Fig. 2.

It was found that in December redfish fry occurred on the Store-Hellefiske Bank (68°N). Hansen and Hermann (1953) state that slightly to the north, in the bight of the Disco Island (69°N), young redfish are highly abundant. We think they are the grown fry carried by the current from the south every year.

It is not yet known to what species the pelagic fry taken off East and West Greenland belong. The predominance of adult S. marinus (L) in those areas gives reason to suppose that the drifting fry are also S. marinus (L). Our materials collected during the cruise in question also confirm this supposition. In October, on the East Greenland Shelf in the Angmagssalik Bank area at 200 - 300 m an average of 167 (maximum 291) young redfish were taken per hour trawling with a bottom trawl with a 10 mm mesh net inserted. Their sizes were 7 - 27 cm, mode at 10 - 11 cm (Fig. 3). From their appearance they were considered to belong to S. marinus (L). The serological blood analysis of these young redfish carried out during this cruise by Ju.P. Altukhov also confirmed the primary species identification. Small specimens of S. mentella Travin occurred very seldom on the East Greenland shelf.

Henderson (1964b) supposed that redfish larvae taken near the Reykjanes Ridge are S. mentella Travin. Therefore the pelagic fry drifting in Greenland waters may be S. mentella Travin. It is very likely that in Greenland waters in June-July larvae of mainly S. marinus (L)

drift from the breeding grounds of East Greenland and Southwest Iceland. Later, in autumn, larvae of S. mentella Travin are likely to drift off Southwest Greenland from the breeding grounds in the Irminger Sea. But the future fate of S. mentella Travin in the Greenland waters remains unknown.

Occurrence of Adult Redfish

During the whole period of our investigations no specimens of S. marinus (L) were caught. On six occasions a total of 10 specimens of S. mentella Travin were taken. The data on these redfish are presented in Table 2.

Beyond the slope small specimens (18 - 27 cm) of S. mentella Travin were encountered, the phenomenon which had not been observed before (Hansen and Andersen, 1961; Zakharov, 1963, 1964; Henderson and Jones, 1964).

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Table 1. Distribution of redfish fry by depths, September 1964.

Date	Position	Fishing depth (m)	No. of trawl hauls	Mean No. of fry per 1 hour trawling
24	59°25'N 46°38'W	100	1	8
24-26	59°28'N 45°40'W 59°26'N 43°10'W	200	2	311
24	59°19'N 44°02'W 59°09'N 41°52'W	300	2	85
27	59°17'N 41°58'W	400	1	32

Table 2. Fishing area, size and maturity of adult S. mentella Travin taken in September, 1964

Date	Position	Fishing depth (m)	Fish length (cm)	Sex and maturity
15	63°40'N 55°00'W	300	36 20 18	4 1 1
16	63°44'N 53°30'W	200	41 33 26	3 4 2
17	63°10'N 55°00'W	300	27	2
21	62°16'N 51°07'W	300	39	3
24	59°25'N 46°38'W	100	41	3
27	61°00'N 40°54'W	200	46	9 - 2

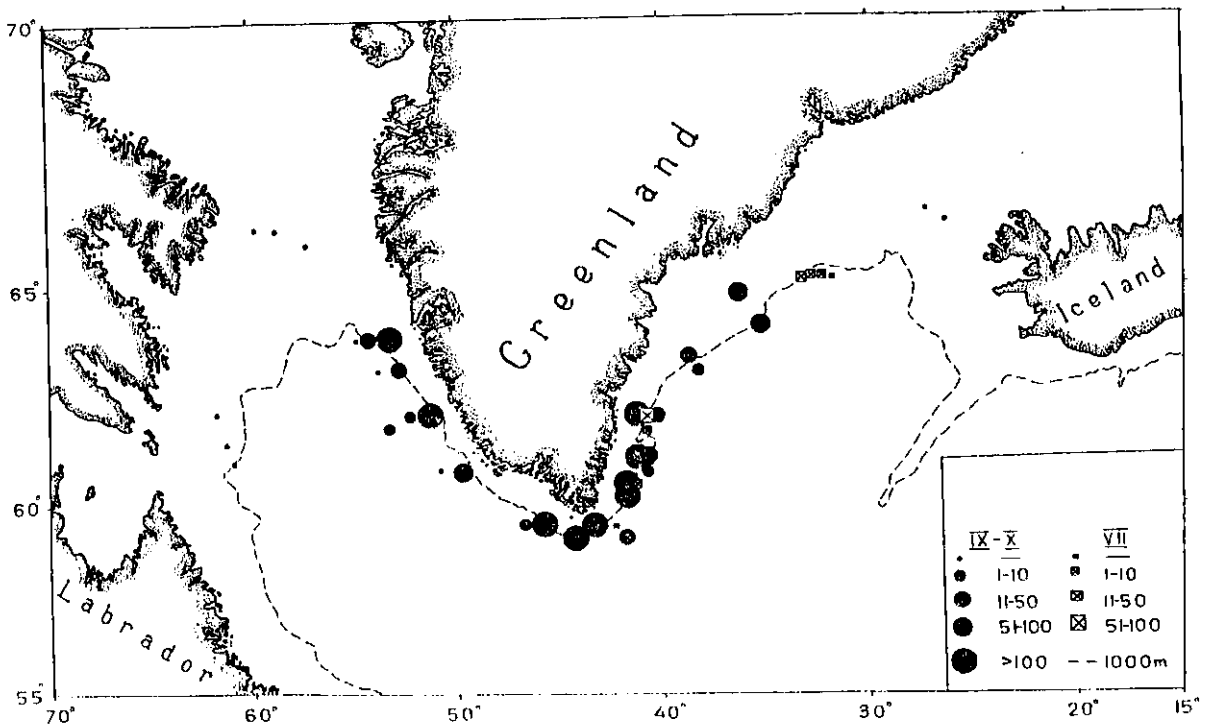


Fig. 1. Distribution of redfish fry taken by midwater trawl in the Greenland area.

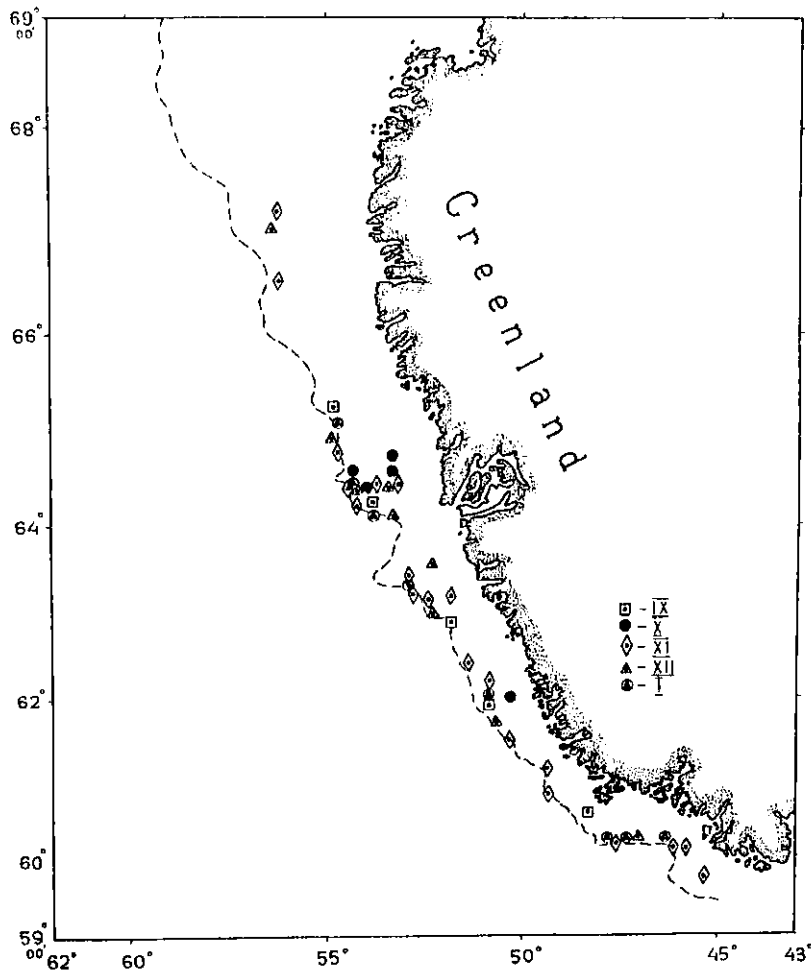


Fig. 2. Distribution of redfish fry taken in cod stomachs off West Greenland by months during 1958-1964.

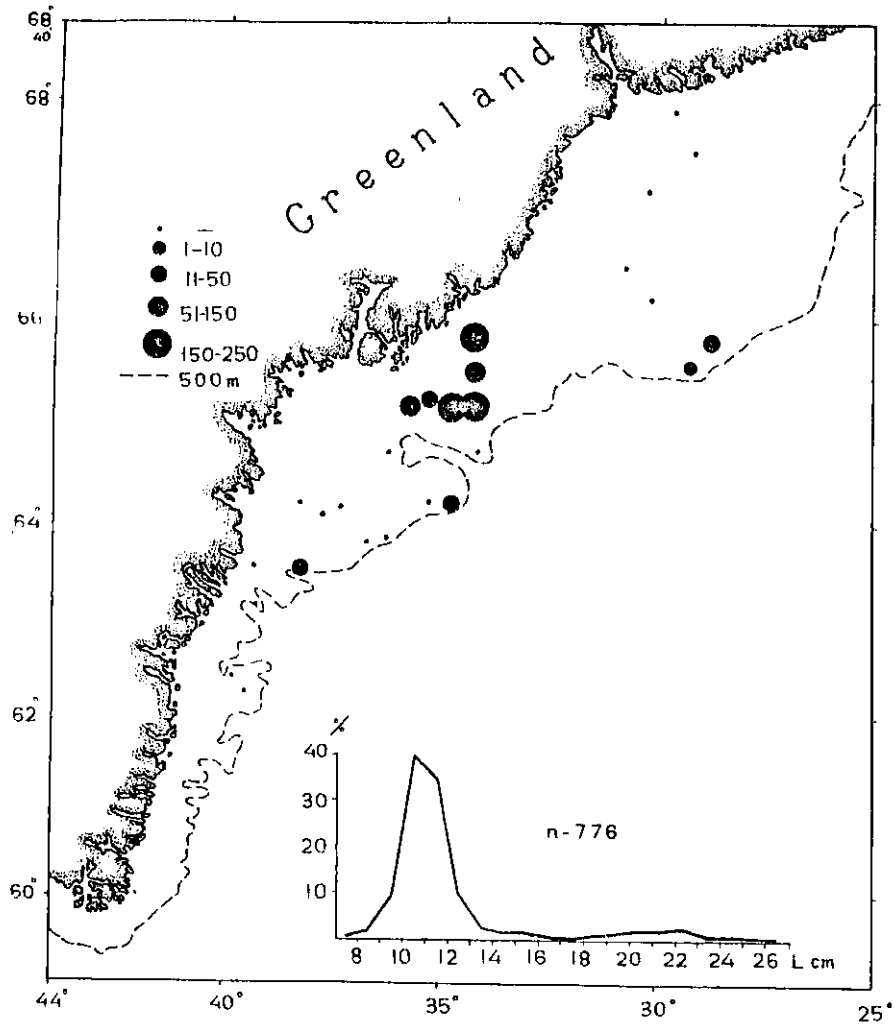


Fig. 3. Distribution and size composition of young *S. marinus* (L) taken per 1 hour bottom-trawl hauls off East Greenland in October 1964