Preliminary Results of Tagging Experiments with Herring (*Clupea harengus* L.) in Greenland

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Introduction

The herring, *Clupea harengus* L., occurs in Greenland waters along both the west and the east coast, but in small quantities only. Its distribution is shown in Figure 1. It is most commonly found in the Julianehaab district, but is also frequently met with in large numbers in certain localities in the Frederikshaab and Sukkertoppen districts.

Otto FABRICIUS mentions the herring in his "Fauna groenlandica" published in 1780, but at that time it was hardly as numerous as today, even though at Frederikshaab it was a well-known fish, which was now and then captured by the Greenlanders. During the present warm period the stock of herring has probably increased in number, but the fishery to which it is subjected is of minimal importance, and the tagging experiments likewise show that it is hardly present in particularly great numbers. Up to about 1950 a small herring fishery was carried out in the Julianehaab district, where the herring was bought from the Greenlanders to be salted at the sheep-breeding station. In recent years the catch has hardly been larger, but the herring is now only used for consumption, and to a very modest extent it is frozen and used as bait on the cod long-lines.

It is only during the summer that the herring is observed and captured along the coasts of Greenland. It appears in early summer in bays and coves in shallow water, where the spawning likewise takes place close to the coast line in August-September. Where the herring spends the winter, is not known with certainty, as its presence has never been ascertained by means of the echo-sounder in the fjords or along the shore, nor has it been found in the stomach contents of cod. In the winters of 1957–58 and 1958–59, however, herrings were captured by means of jigs in quite shallow water off Tasiussak in Tasermiut Fjord (Nanortalik district). The Greenlanders' normal summer fishing for herring takes place with set gill-nets or hand seines.

According to investigations by HANSEN the herring caught at West Greenland show racial characters identical with the summer spawning herring of Iceland

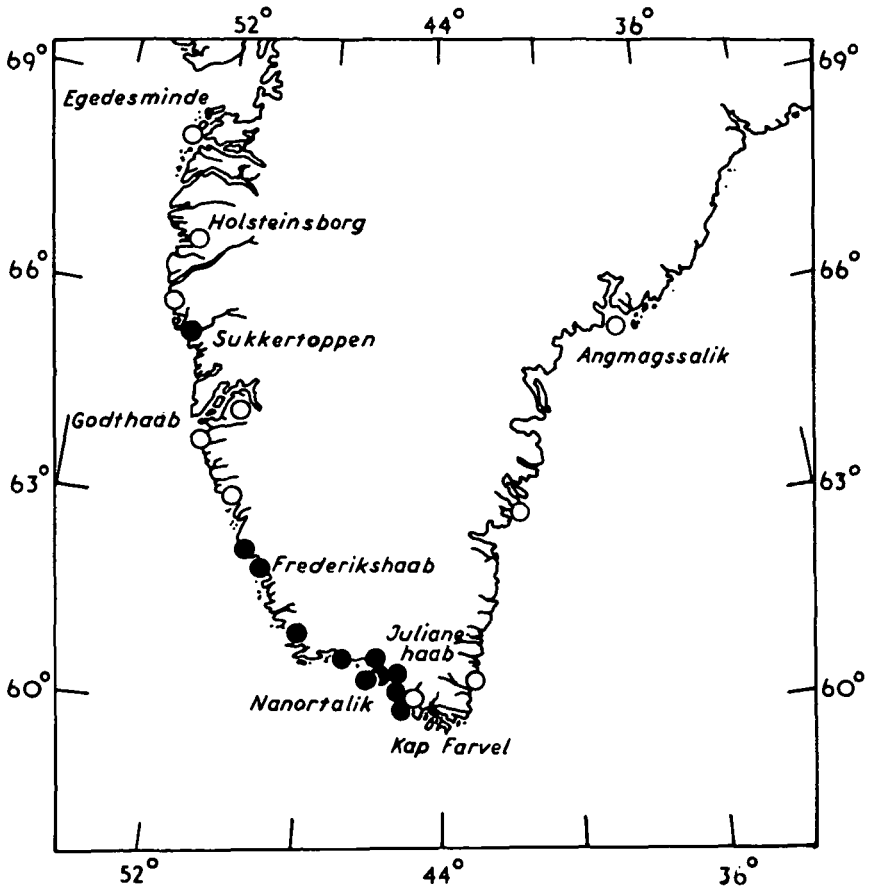

Figure 1. Distribution of herring in Greenland. Closed circles indicate localities where fishing is regularly carried on. Open circles indicate scattered occurrences.

Table 1

Number of vertebrae of Greenland herring

Locality	North latitude	Year	Number of vertebrae	Number of specimens
Sukkertoppen	65°30′	1930	57·10	101
Avigait.....	62°15′	1932	56·89	172
Sardlok	60°35′	1932	56·94	150[1])
Sardlok	60°35′	1930 and 1932	56·92	100

[1]) Spawning herring.

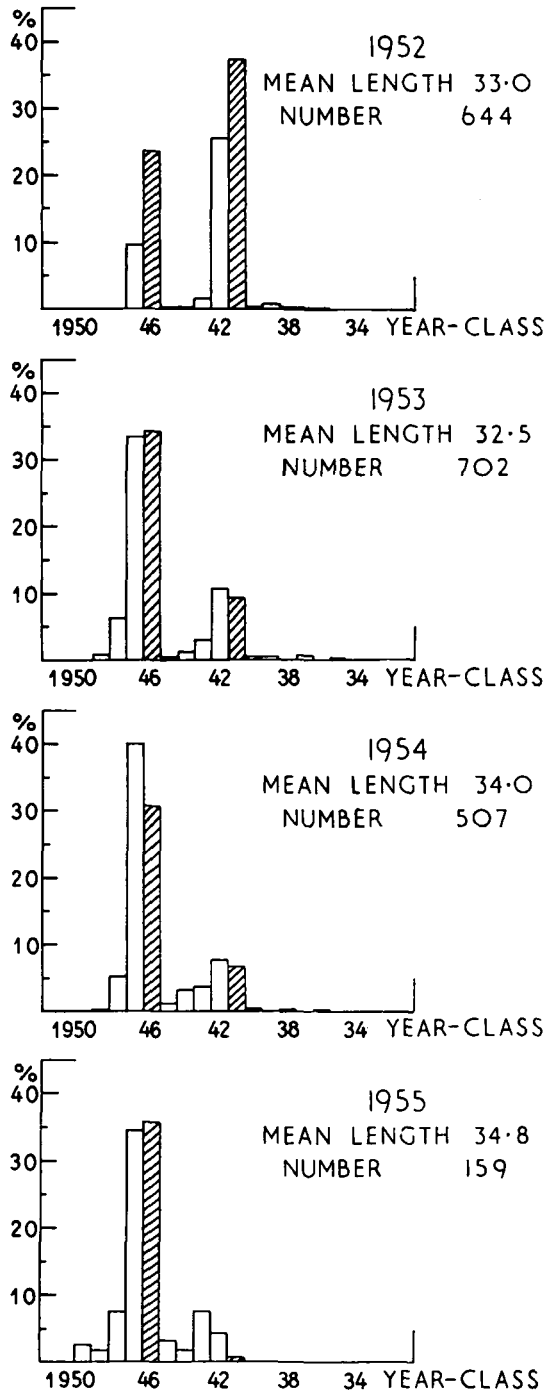

Figure 2. Age composition of Greenland herring from the Julianehaab district 1952–1955. The mean length indicated is total length in centimetres.

Table 2

Growth of Greenland herring. Mean total length in cm of the dominating year-classes in 1950–1956

Year	Year-classes 1947	1946	1942	1941
1950	14·0	19·9	–	–
1951	–	–	–	–
1952	26·9	30·4	36·1	37·1
1953	29·7	31·7	36·2	37·2
1954	31·9	33·2	38·2	39·2
1955	34·0	35·3	–	–
1956	34·9	36·2	–	–

(TÅNING, 1936). HANSEN concludes there probably is only this one herring race in Greenland (HANSEN, 1934). Table 1 shows the number of vertebrae from different samples of Greenland herring.

Age determinations have been undertaken by HANSEN and NIELSEN. Some preliminary results have been published (HANSEN, 1937, 1939, and 1940; NIELSEN, 1955, 1956, and 1957). A special publication on the age investigations on Greenland herring is prepared by the author. Figure 2 shows the age determinations of a few samples from Julianehaab district. It is evident that certain year-classes are dominating in the catches. The growth of the herring is shown in Table 2, where the mean lengths of the dominating year-classes are given in different years.

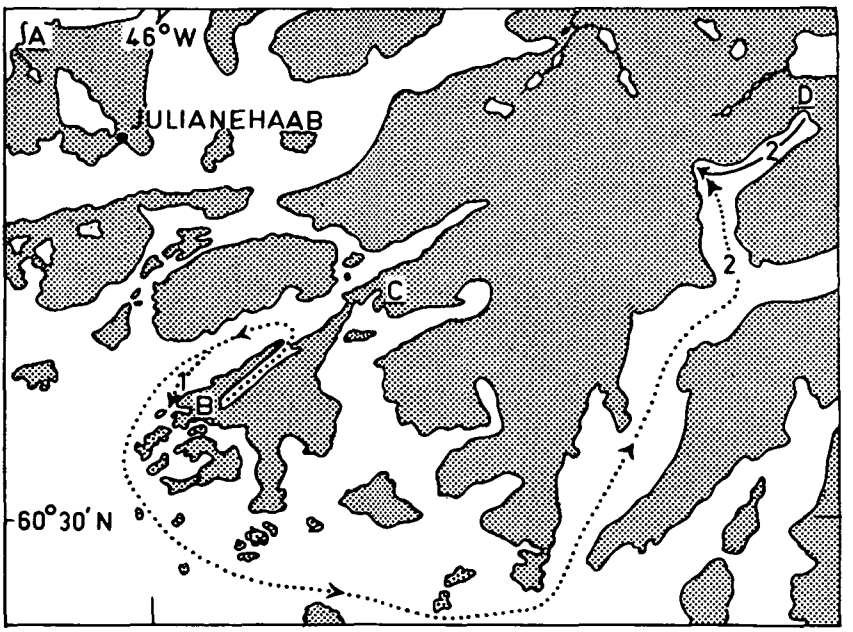

Figure 3. Migrations of the herring in the Julianehaab district. The letters indicate the tagging localities (see Table 3). The figures at the dotted lines indicate the number of tagged herrings migrated from the place of tagging to the localities of recapture.

Tagging Methods

In the years 1949 and 1952–54, tagging of a small number of herrings, totalling 451, was carried out by the Greenland Fisheries Investigations. A later tagging experiment, started in 1958, is of such a recent date that it will not be mentioned here.

The tagging localities of the experiments in 1949 and 1952–54, with the exception of the locality of Kangerdluarssuk in the Sukkertoppen district, are shown in Figure 3. Table 3 is a survey of the taggings and the recaptures made so far. Further recaptures from these experiments can hardly be expected.

All the herrings tagged were captured near the shore by means of hand seines, which are dragged to the shore. In 1949 Lea hydrostatic tags were used for tagging, while later on plastic tags attached by black terylene spinner line (breaking strength 11 lbs.), were employed. In the experiments in 1958 the tags were fastened by soft stainless wire, diameter 0·40 mm. The tags were attached to the front edge of the dorsal fin. In 1949 and 1952 the herring was measured when tagged, but in subsequent experiments the herring was not measured, for in such case the fish can be kept under water during the whole tagging process. While under water, the herring is driven into a small rubber case of the shape of a shoe, and by this procedure touching of the fish by the hands may be almost avoided.

Results

Hitherto no recaptures have been reported from the taggings in 1949 and 1952. Whether this is due to the somewhat more rough tagging method employed in these two years, when the herring was taken out of the water and measured, can hardly be decided on the basis of such a small material. In 1953, 100 herrings were tagged at Sukkertoppen, 31 of which were recaptured three weeks later in the same place. No later recaptures have been reported from this tagging experiment, but the recaptures made shortly after showed, however, that the herring was capable of surviving the tagging, and the tagging experiments were therefore continued in 1954.

In 1954, three tagging experiments were made, two at Sangmissoq (B in Fig. 3), and the third at Amitsuarssuk at the head of Lichtenau Fjord (D in Fig. 3). From the tagging experiments at Sangmissoq, when altogether 158 herrings were tagged, two were recaptured the next day in the same place. One was recaptured at Kangerdlugssuagtiaq, located 17 km from the place of tagging. Two had migrated to Qagdlimiut in Lichtenau Fjord (see Fig. 3), a distance of about 75 km. This indicates that the herrings from the different fishing grounds are intermixed, so it is not exclusively the same herring that return every summer to the same locality.

At Amitsuarssuk in Lichtenau Fjord (D in Fig. 3), 88 herrings were tagged. Eight of these were recaptured next year, six of them in the place of tagging, while two were taken at Qagdlimiut, which is located farther out in the same fjord hardly 10 km from the tagging place (see Fig. 3).

If in the experiment at Sangmissoq we disregard the two herrings recaptured the next day, twenty-one of the 244 herrings tagged in 1954 were recaptured the next year, which means a recapture percentage of 8·6. It must be taken for granted that a great many herrings will die as a result of the taggings, the herring

Table 3

Tagging experiments with herring in Greenland and recaptures

Tagging					Recapture			Number of *months* in the sea	Distance *migration* in km
Year	Date	Locality	Type of tag	Number	Date	Locality	Number		
1949	8. Aug.	A. Eqalugarsiut, Jhb.	Lea hydrostatic	15	–	–	–	–	–
1952	21. Aug.	B. Sangmissoq, Jhb.	Yellow plastic	65	–	–	–	–	–
1952	25. Aug.	C. Itivdliatsiaq, Jhb.	Yellow plastic	25	–	–	–	–	–
1953	11. June	Kangerdluarssuk, Skt.	Yellow plastic	100	June 1953	Same place	7	0	0
					July 1953	Same place	24	1	0
1954	9. Aug.	B. Sangmissoq, Jhb.	Red plastic	83	Aug. 1954	Same place	2	0	0
					June 1955	Same place	2	10	0
					June 1955	Kangerdlugsuagtiaq	1	10	17
					July 1955	Qagdlimiut	2	11	75
					July 1955	Same place	3	11	0
1954	16. Aug.	D. Amitsuarssuk, Jhb.	Red plastic	88	July 1955	Qagdlimiut	2	11	10
					July 1955	Same place	6	11	0
1954	18. Aug.	B. Sangmissoq, Jhb.	Red plastic	75	June 1955	Same place	3	10	0
					July 1955	Same place	2	11	0
			Total	451		Total	54		

being a very delicate fish and difficult to tag, so this recapture percentage is fairly high—more especially if it is taken into consideration that the herring fishing within the district is not particularly intensive, but is carried out quite casually and occasionally by a few Greenland fishermen.

The relatively high recapture percentage suggests that the herring population in Greenland is rather small. The tagging experiments likewise show that it is the same herring which return to the herring grounds summer after summer, though migrations take place between the various fishing grounds. This was also to be expected, for by investigations of the age of the Greenland herring it has turned out as already mentioned that it is special year-classes which are dominant in the catches. The recaptured herrings from the taggings at Amitsuarssuk, where very big herrings were tagged (32–42 cm total length), were 12–14 years old. The recaptured herrings from the other two taggings were 7–9 years old, a single one, however, being 12 years old.

As regards nine of the recaptures, the questions on the recapture label as to whether the fish was sound or ill when recaptured, are answered. Five of these were stated to be sound (and mature), while four were stated to be ill (and immature). This may perhaps indicate that the tagging process or the tag itself may be injurious to the herring.

Summary

Herring occur in small numbers in the coastal waters of Greenland, particularly in southern West Greenland, where a small herring fishery takes place in summer when the herring migrate to the inner parts of the fjords to spawn. In the years of 1949 and 1952–54 tagging experiments were made. The recaptures show that the herring for the most part return to the same fjords summer after summer, though sparse migrations may take place from individual localities to others. The comparatively high recapture percentage shows, considering the low intensity of the herring fishery, that the herring are present in small numbers only.

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