

ANNUAL MEETING - JUNE 1965*Redbook 1965 (III)*Results of cod tagging by the Federal Republic of Germany in the Greenland area
from 1959 to 1964

by Arno Meyer

From 1959 to 1964, 2,936 cod were tagged. The main aim of these tagging experiments was to study the migration of the East Greenland stock of cod. Therefore tagging was carried out mainly off Southwest, South and Southeast Greenland (Table 1). Up to 24 March 1965, 196 tags were returned. The recovery rate to date is 6.7%.

Table 1. Numbers of cod tagged off Greenland, by regions and years, from 1959 to 1964.

Year Region	1959	1960	1961	1962	1963	1964	Total
E. Greenland	-	-	121	4	-	-	125
SE. Greenland	-	201	-	-	-	-	201
1F	215	432	-	120	38	327	1132
1E	274	215	-	-	40	33	562
1D	62	329	-	105	15	221	732
1C	-	-	-	-	-	155	155
1B	-	-	-	-	-	29	29
Total	551	1177	121	229	93	765	2936

The recaptures came from the following regions:

	No.	%
Subarea 1	149	76
Southeast Greenland (south of 63°N)	5	24
East Greenland (north of 63°N)	5	
Iceland	33	
East Greenland or Iceland	4	
	<u>196</u>	<u>100</u>

Table 2 shows the areas of taggings and recaptures of 47 cod caught off the eastern coast of Greenland and off Iceland and the time between tagging and recapture (in days).

Table 2. Number and location of tagged and recaptured cod in Greenland and Iceland waters showing, in brackets, the range and average number of days from tagging to recapture.

Tagged off \ Recaptured off	SE Greenland (5)	E Greenland (5)	Iceland (33)	E. Greenland or Iceland (4)
E. Greenland (125)	- - -	1 390 days -	3 182-750 days (avg. 401)	- - -
SE. Greenland (201)	1 182 days -	- - -	2 258-840 days (avg. 549)	1 720 days -
Div. 1F (1132)	2 108-343 days (avg. 225)	3 94-335 days (avg. 181)	7 184-1230 days (avg. 574)	1 690 days -
Div. 1E (562)	- - -	1 1650 days -	14 164-1620 days (avg. 952)	1 840 days -
Div. 1D (732)	2 570 days -	- - -	7 133-1590 days (avg. 721)	1 1200 days -
Div. 1C (155)	- - -	- - -	- - -	- - -
Div. 1B (29)	- - -	- - -	- - -	- - -

Table 3 gives for the different areas the distribution of recaptures over the years 1960 to 1965. It also shows the range in length and the average length and, for 26 returns with otoliths, the range in age, the mean age, and the year-classes of the recaptured fish.

Table 3. Length, age and year-class of cod recaptured east of Greenland and off Iceland between 1960 and 1965.

	SE Greenland	E Greenland	Iceland	E. Greenland or Iceland
1960	1	1	4	-
1961	2	1	6	-
1962	-	1	8	1
1963	-	-	6	2
1964	2	1	9	1
1965	-	1	-	-
Length (cm)	73-91 (avg. 82, 3)	75-79 (avg. 76, 9)	71-97 (avg. 83, 4)	58-86 (avg. 73, 3)
Age	7-14 years (avg. 10, 2)	9-11 years (avg. 10, 0)	7-12 years (avg. 8, 7)	7-11 years (avg. 8, 0)
Year-Classes	1947, 1949, 1950 1956, 1957	1950(2), 1956	1950(2), 1951, 1952(2) 1953(3), 1954(2), 1955 1956(3)	1951, 1956(2) 1957

Tables 2 and 3 show a considerable migration of cod from Divisions 1D, 1E and 1F to the eastern side of Greenland and to Iceland. From the length and age composition as well as from the state of the gonads and the time of recapture of the fish, we can deduce that their eastward migration is a spawning migration. Only maturing and mature cod move from West Greenland to the presently

known East Greenland spawning grounds on Bille Bank (62°N), Fylkir Bank (62°30'N) and Dohrnbank (30°W) and to the spawning areas off West and Southwest Iceland. Seventy-three percent of all 33 recaptures off Iceland were made within the short time (spawning time) between 14 March and 20 May (Fig. 1). Nine of the 10 recaptures off Southeast and East Greenland were made during the winter from 1 December to 28 April. From the fact that, to date (the only exception seems to be a tagging experiment in 1931 off Southwest Iceland), no cod tagged off Iceland was recaptured in Greenland waters, we may presume that Greenland cod spawning off Iceland remain after spawning in Iceland waters. This is confirmed by recaptures of 2 cod off East Iceland in September and November, which were tagged 18 1/2 months and 3 3/4 years previous in Divisions 1E and 1F. After spawning off West or Southwest Iceland, these 2 cod probably were caught on their feeding migrations via North Iceland to East Iceland.

The speed during the spawning migration must be considerable. Within less than 205 days a cod tagged on Fyllas Bank covered at least 1,270 nautical miles to Ingolshófdi on the south coast of Iceland. This is an average speed of at least 6.2 miles per day. Another cod tagged on Danas Bank was recaptured 133 days later off Northwest Iceland (Gammelloch). The speed must have been more than 7.5 miles per day.

The German tagging experiments further confirmed the validity of the age determinations. The greatest increase in length (47 cm) between tagging and recapture was made by a cod of 44 cm tagged on Danas Bank and recaptured off Northwest Iceland 4 years and 5 months later with a length of 91 cm. A much faster growth was demonstrated by a cod tagged at 40 cm off Noname Bank and recaptured 2 years and 11 months later off West Iceland with a length of 84 cm. Fig. 2 shows the relation between time and increase of length of tagged cod recaptured off West and East Greenland and Iceland. The broken line gives the average increase in length for all cod caught as immature fish or when spawning for the first time. The average increase in length of these cod is about 10 cm per year. The solid line shows the somewhat smaller growth (7 cm per year) of those cod which were recaptured after having spawned one or more times.

We have very little information on the location of the spawning grounds of the West Greenland stock of cod. As far as we know they spawn on the western slopes of the banks in Divisions 1D and 1E. But there are signs that the West Greenland cod, especially when they became older, tend to extend their spawning migrations more to the south and even to the eastern side of Greenland, as was shown by the strong 1947 year-class in West Greenland waters. Also the German Research Report for 1964 (1965 Research Document No. 11) shows that a substantial part of the 1957 year-class in West Greenland waters spawned in 1964 off Southeast Greenland, while the 1956 year-class in East Greenland waters migrated for spawning further to the north to Dohrnbank and possibly to Iceland. Perhaps this surprisingly strong appearance of the 7-year-old cod off Southwest Greenland should be examined in connection with the somewhat anomalous hydrographic conditions off West Greenland in 1963 and 1964.

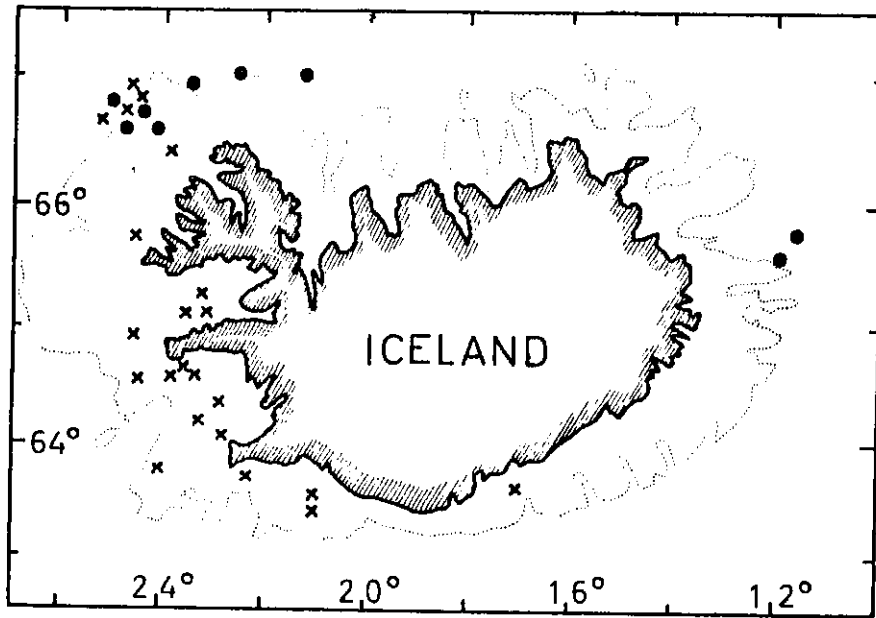


Fig. 1. Location of recaptures off Iceland.
Recaptures from 14 March to 20 May (x),
Recaptures at other times of the year (•).

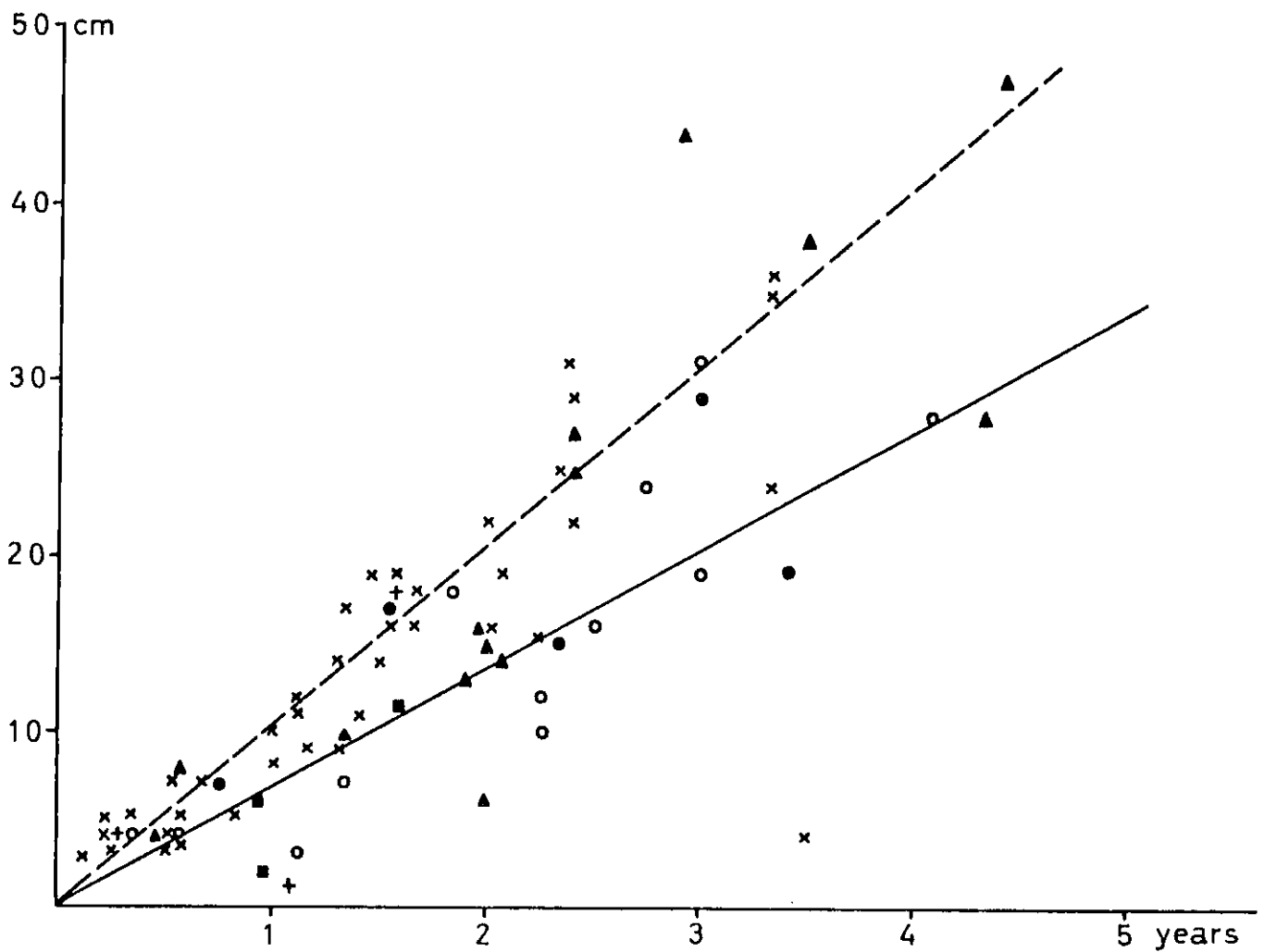


Fig. 2. Relation between time and increase in length.
Average increase in length of immature cod (-----)
and mature cod (—————)
Immature cod recaptured off West Greenland (x), East Greenland (+)
and Iceland (▲). Mature cod recaptured off West Greenland (o)
East Greenland (■) and Iceland (●)