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Report on a Salmon Long-lining Cruise off the Faroes during April 1970

by

G. Struthers

D.A.F.S., Pitlochry

This report gives the results of a salmon long-lining and tagging cruise carried out by the Faroese research vessel 'Jens Chr. Svabo' from 1st to 18th April, in which two members of staff[a] from the Department of Agriculture and Fisheries for Scotland participated. The cost of this cruise was shared equally by D.A.F.S. and Fiskirannsoknarstovan, Thorshavn.

The gear and the methods used in fishing were as described in the 1969 report (4.FW.70.) but, in an effort to improve the 1969 tagging rate, alterations were made to fish handling techniques. In particular, the practice of removing the hook from all salmon as soon as they were lifted on board by hand-net was discontinued. On this cruise the hook was removed immediately only from dead fish while, for live fish, the snood was cut and the fish placed in a large, rectangular tank (4.75 x 2.25 x 2 feet) containing approximately 130 gallons of circulating sea water. After a suitable recovery period (usually about 10 minutes), those which did not appear suitable for tagging were killed and the remainder anaesthetised individually in a 40p.p.m. solution of MS 222.

When fully anaesthetised each fish was examined, the position and severity of hooking noted and, where possible without causing serious damage, the hook was removed. Thereafter, fork and total length were recorded, a scale sample taken and the fish tagged. After tagging fish were returned to a second identical tank and released when they had recovered, usually within 30 minutes. Any fish which did not recover fully after tagging were killed.

Two types of tag were used. Most of the fish were tagged with a numbered yellow plastic plate bearing the legend 'Return to Fishlab, Pitlochry, Scotland - Reward' and with an attachment similar to that of the Faroese cod tags used last year. Towards the end of the cruise a small number of fish were tagged with a numbered yellow Floy Anchor tag bearing only the additional message 'Scotland, Reward'. These tags were inserted with a Floy 'Tagging gun'.

In addition to the details recorded for live fish, the sex, stomach contents and, where possible, the weight of dead fish were noted. During the early stages of the cruise it was only possible to weigh salmon over 3kg but latterly, all dead fish were weighed.

Lines were fished on twelve occasions and details of fishing stations, wind conditions and catch are given in Table 1. The positions of the stations in relation to the Faroes are shown in Fig. 1.

In general hooking rates were lower than in 1969 and the overall average of 40 salmon/1000 hooks was only half that recorded last year but was nevertheless very satisfactory and provided worthwhile numbers of fish for tagging. The suggestion, made in earlier reports, that there was a relationship between wind strength and catch was not borne out on this cruise as the best catches were taken in wind strengths of only 2 to 4. This may, however, have been due to differences in the density of salmon present at the different fishing stations.

a G. Struthers, Freshwater Fisheries Laboratory, Pitlochry.
A. Ranachan, Marine Laboratory, Aberdeen.

It was possible to determine the age of all but one of the fish caught and details of the age composition of the catch are given in Table 2. As in the 1968 and 1969 samples, most had migrated as two or three year-old smolts and the majority had just completed their first winter in the sea. However, the proportion of one-sea-winter fish in this year's catch (75%) was considerably lower than that recorded in 1969 (91%).

Average lengths for each age class among 362 maiden fish have also been calculated and are shown in Table 3, together with average observed lengths and plus growth and the observed lengths and age classification of the three previous spawners caught. Compared with the 1969 figures, both first and second sea winter average lengths were slightly greater and the average plus growth of one-sea-winter fish was 1.5cm. better.

Table 4 gives details of length and sex for the fish examined each day, while the length frequency distributions in 1969 and 1970 are compared in Fig. 2. The 271 one-sea-winter fish ranged in length from 47 to 65cm. with 95% measuring 60cm. or less. In the older sea age groups, excluding previous spawners, only 5.6% were less than 70cm. in length, the smallest measuring 62cm.

Of the 132 salmon which were sexed, 70 were females and 62 males giving a ratio 1.2 to 1, a value identical with that recorded last year. However, when the sample was segregated on the basis of sea age, two distinct ratios emerged. In the sample of 95 one-sea-winter fish, males predominated over females in the proportion of 1.3 to 1 whereas, among the two-sea-winters and older fish, the ratio was 4.3 females to 1 male. When these two ratios were applied to the appropraite age categories in the total catch they gave an overall estimated sex ratio of 1.14 females to 1 male.

Individual weights are available for 84 salmon. The average weight for the fish within each 5cm. length group in this sample is given in Table 5. Using these values and the numbers of fish in each 5cm. group in the total catch, the total weight of the 366 fish caught was estimated at 920kg., giving an average weight of 2.5kg.

Condition factors (K) for individual fish were determined from the formula:

$$K = \frac{100W}{L^3}$$

where W = Weight in grams.
L = Length in centimetres.

The average condition factor for each 5cm. length group is also shown in Table 5. These values tend to support the impression gained last year that larger fish were in better condition, particularly those over 84cm. in length.

Of the 132 stomachs examined, 48 (36.4%) were empty and 60 (45.5%) contained crustaceans, principally amphipods (probably Themisto spp.), but a few euphausiids were also present. Sprats (Sprattus sprattus) were found in 32 stomachs (24.2%) but almost all of these were recognised as bait. Six salmon (4.5%) contained sand eels (Ammodytes spp.) and the remaining 5 (3.8%) were found to have unidentifiable fish remains in their stomachs.

No fish other than salmon were caught on the long lines but a number of guillemots, two gannets and a porpoise were taken.

The improved handling arrangements on board the 'Jens Chr. Svabo' were reflected both in a marked improvement in the proportion of salmon suitable for tagging and in the condition of the fish released after tagging. Of the total of 366 fish caught, 233 (63.6%) were tagged, compared with only 17.4% in 1969. Faroese-type tags were attached to the first 200 fish tagged, while Floy tags were used on the remaining 33. As in 1969, larger fish suffered more serious damage from hooking. Just over 56% of the salmon measuring 70cm. or more were suitable for tagging whereas, 65% of those less than 70cm. were tagged. The hook was removed from 70% of the tagged salmon.

The improvement in the condition of the fish tagged has presumably been mainly responsible for the encouraging number of recaptures reported to date. So far 11 recaptures (4.7%) have been recorded, 10 marked with Faroese-type tags and one with a Floy tag. Five were reported from Scottish waters, three from Ireland, two from Norway and one from the Northumberland coast in England. Tagging and recapture details are shown in Table 6.

Of the 179 one-sea-winter fish which were released, 8 (4.5%) returned as grilse while 3 (5.9%) of the 51 two-sea-winter fish tagged were recaptured. One interesting and encouraging aspect of these recaptures is that, while the hook was 'left in' in only 30% of the tagged fish, 5 (45%) of the recaptures were of fish in which the hook had been left in position.

At least three commercial long-liners were reported as fishing for salmon off the Faroes during March and April. The Norwegian vessel, 'Leithe Senior', was reported to have caught 1200 fish in four days during the last week in March, while approximately 200 salmon were caught in three days in early April by the Faroese boat 'Savarennid'. According to reports, catches taken by these two boats and another Faroese long-liner, the 'Glottin', were much lower after the first week in April, which agrees with the general pattern of catches made by the 'Jens Chr. Svabo'.

Grateful acknowledgement is made to Mr. J.S. Joensen of Fiskirannsoknarstovan and his staff, without whose assistance and facilities this programme could not have been carried out.

Table 1

Date		Position	Wind	No. of Hooks	No. of salmon Caught	No. of salmon Tagged	Catch per 1,000 hooks
April	2	62° 39'N. 5° 31'W.	NW (2)[a]	770	62	35	80
	3	63° 00'N. 8° 32'W.	NW (2)	770	42	33	54
	4	62° 52'N. 6° 34'W.	N (3)	750	53	30	71
	6	62° 50'N. 5° 51'W.	NE (4)	750	47	30	63
	7	63° 05'N. 7° 05'W.	N (6)	720	35	25	49
	8	63° 26'N. 9° 10'W.	NE (7)	560	21	15	38
	10	62° 39'N. 5° 31'W.	NE (6)	820	39	28	48
	11	62° 39'N. 5° 31'W.	NE (2-4)	820	22	11	27
	13	62° 40'N. 5° 22'W.	Nil	820	1	1	1
	14	62° 46'N. 5° 10'W.	S (3-4)	820	16	10	20
	17	62° 39'N. 5° 31'W.	SW (4)	800	20	8	25
	18	62° 40'N. 5° 40'W.	NW (7)	700	8	7	11
			Overall	9,100	366	233	40

a = Wind strength

Table 2

Smolt Age	Sea Winters 1	2	3	4	Previous Spawners	Total
1	3 (0.8)[a]	1 (0.3)	-	-	2 (0.5)	6 (1.6)
2	205 (56.1)	30 (8.2)	1 (0.3)	-	-	236 (64.6)
3	62 (16.9)	36 (9.9)	-	1 (0.3)	1 (0.3)	100 (27.3)
4	2 (0.5)	17 (4.7)	-	-	-	19 (5.2)
5	1 (0.3)	2 (0.5)	-	-	-	3 (0.8)
?[b]	-	1 (0.3)	-	-	-	1 (0.3)
	273 (74.7)	87 (23.8)	1 (0.3)	1 (0.3)	3 (0.8)	365

a = Numbers in brackets are percentages of total sample.
b = Unreadable.

Table 3

Age Class	No. in Sample	Average Observed Length (cm.)	Freshwater Winters 1	2	3	4	5	Sea Winters 1	2	3	4	Plus Growth (cm.)
1.1+	3	57.0	8.7					52.0				5.[illegible]
2.1+	205	55.3	4.7	12.1				50.3				5.0
3.1+	62	55.0	3.2	7.4	12.3			50.0				5.0
4.1+	2	55.5	2.0	4.2	7.5	10.8		48.8				6.2
5.1+	1	48.0	2.0	4.5	7.0	10.0	12.0	42.0				6.0
Overall	273	55.2						50.2				5.0
1.2+	1	76.0	9.0									
2.2+	30	75.8	4.4	11.5				44.0	74.0			2.0
3.2+	36	78.2	3.3	6.8	11.0			47.8	73.8			2.1
4.2+	17	75.9	2.9	5.4	8.6	12.1		48.2	75.3			2.9
5.2+	2	80.5	2.5	4.8	7.2	10.8	13.8	45.1	72.5			3.5
?.2+	1	81.0						47.5	76.3			4.2
Overall	87	77.0						47.4	74.2			2.8
2.3+	1	86.0	5.5	12.0				43.0	73.0	86.0		-
3.4	1	99.0	3.0	6.5	10.5			49.0	79.0	91.0	99.0	-

Previous Spawners

3.2(Kelt)[a]	1	67.0
3.1+SM1+	1	71.0
2(?).2+SM(+)	1	85.0

a = $5\frac{1}{2}^{0}$ Erosion

Table 4

Date	No. Measured	Average Fork Length (cm.)	Fork Length Range (cm.)	Sex No. Examined	M.	F.
April 2	61	58.9	48 - 84	27	15	12
3	11	56.7	47 - 81	9	3	6
4	53	60.6	49 - 87	23	9	14
6	47	58.4	49 - 86	17	9	8
7	35	57.5	47 - 76	10	6	4
8	21	64.8	53 - 83	6	1	5
10	39	64.3	51 - 87	10	5	5
11	22	67.8	50 - 90	11	4	7
13	1	77.0		-		
14	16	62.5	51 - 84	6	2	4
17	20	67.0	49 - 99	12	6	6
18	8	60.9	53 - 82	1	-	1
Overall	364	60.8	47 - 99	132	60	72

Table 5

Length Groups (cm.)	Number Weighed	Average Weight (kg.)	Average Condition Factor (K)
45 - 49	3	1.3	1.16 (0.96 - 1.27)[a]
50 - 54	16	1.4	1.00 (0.70 - 1.2)
55 - 59	24	1.9	1.03 (0.71 - 1.18)
60 - 64	5	2.2	1.02 (0.92 - 1.12)
65 - 69	1	2.9	1.06
70 - 74	9	3.8	1.02 (0.88 - 1.16)
75 - 79	11	4.7	1.02 (0.91 - 1.15)
80 - 84	9	5.5	1.03 (0.83 - 1.14)
85 - 89	4	6.7	1.05[b] (0.86 - 1.36)
90 - 94	1	9.5	1.32
95 - 99	1	11.6	1.21
Overall	84		

a = Range

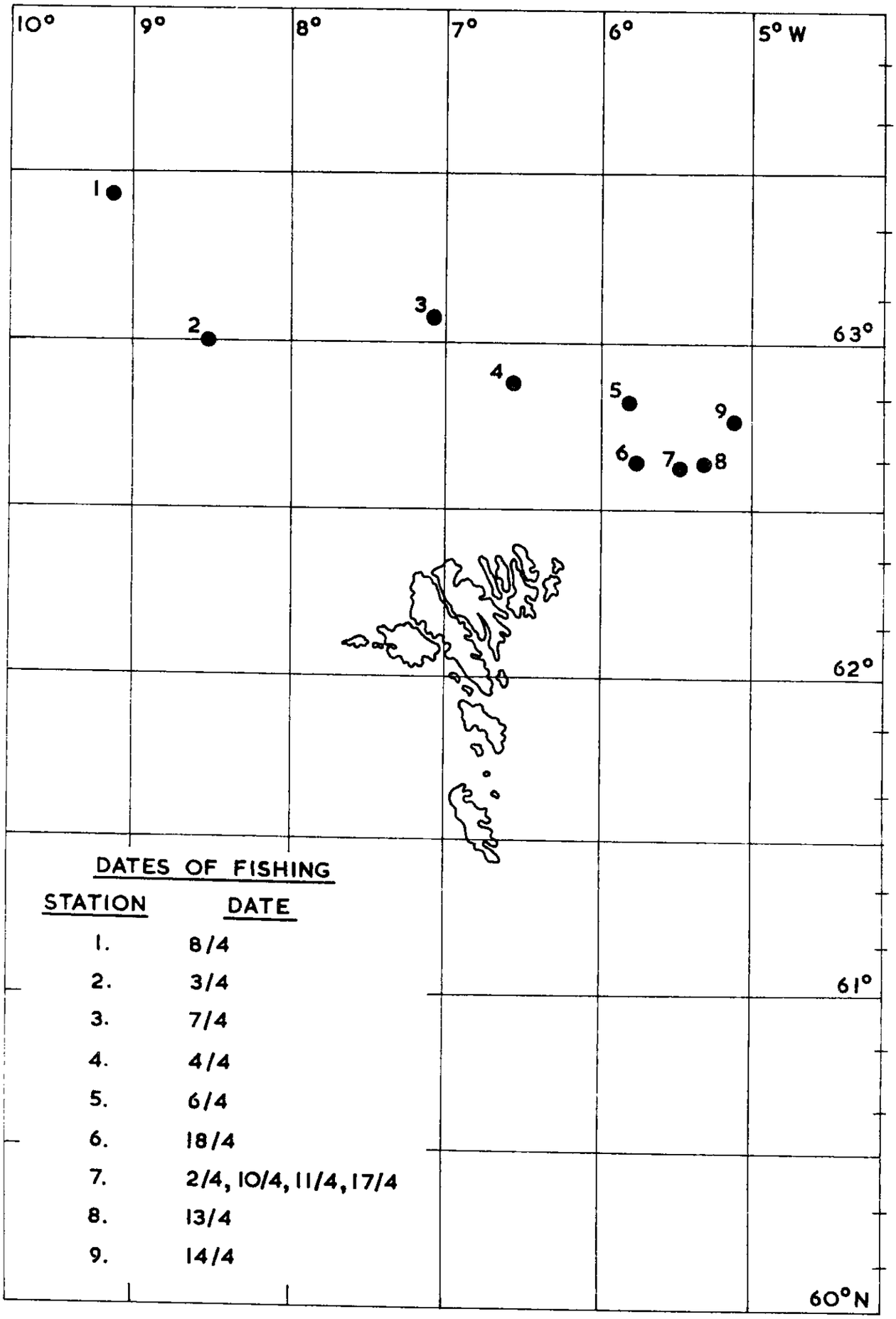
b = One kelt included - average 'K' of maiden fish was 1.12.

Table 6

Tag Number	Date	Tagging Details Fork and Total Lengths (cm.)		Age	Date		Recapture Details Place	Length	Weight
022 (R)[a]	2.4.70	55	59	2.1+	27.5.70	(55)[b]	North Trondelag, Norway	-	2.1kg
035 (L)	2.4.70	78	83	2.2+	31.7.70	(120)	6 miles East of Gare Lighthouse Northumberland, England	32" (81cm.)	8.5lb. (3.9kg)
059 (R)	3.4.70	53	57	3.1+	18.6.70	(76)	Lifjorden Sogne Fjord, Norway.	52cm.	1.5kg
062 (L)	3.4.70	56	60	2.1+	15.7.70	(103)	Youghall Bay, Cork, Eire	-	7.4lb. (3.4kg)
075 (R)	4.4.70	77	81	2.2+	6.6.70	(63)	River Tay, Scotland	-	10-12lb. (4.5-5.5kg)
098 (R)	4.4.70	51	54	2.1+	4.8.70	(122)	Catterline, near Montrose, Scotland	57.5cm.	4.3lb. (2.0kg)
129 (L)	6.4.70	56	59	2.1+	6.8.70	(122)	River Suir, Waterford, Eire	-	-
157 (R)	7.4.70	73	77	2.2+	11.8.70	(126)	River Deveron, Scotland	28.5" (72cm.)	7lb. (3.2kg)
184 (L)	10.4.70	59	62	3.1+	10.7.70	(91)	Rockhall, Scotland	61cm.	4.9lb. (2.2kg)
194 (R)	10.4.70	57	60	2.1+	16.7.70	(97)	River Blackwater or Waterford Harbour or Laune Estuary, Eire	-	5.5lb. (2.5kg)
00052 (L)	18.4.70	56	59	2.1+	5.9.70	(140)	River Spey, Scotland	-	5.4lb. (2.4kg)

a R = Hook removed; L = Hook left in.
b Days absence
c Weights recorded in pounds (lb.) have been converted to kilograms (kg) for comparison.

FIG. 1



DATES OF FISHING

STATION	DATE
1.	8/4
2.	3/4
3.	7/4
4.	4/4
5.	6/4
6.	18/4
7.	2/4, 10/4, 11/4, 17/4
8.	13/4
9.	14/4

FIG. 2 PERCENTAGE LENGTH FREQUENCY DISTRIBUTION