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Greenland Salmon Research Programme, 1971 - 'Adolf Jensen'

by

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In preparation for the proposed international salmon tagging experiment at West Greenland during 1972, two members of staff from the Freshwater Fisheries Laboratory, Pitlochry (DAFS) and one from the Salmon and Freshwater Fisheries Laboratory, London (MAFF) took part in a salmon drift-netting programme by the Danish research vessel 'Adolf Jensen' at West Greenland during September and October 1971. This programme was designed to provide experience in the use of drift nets and in the techniques of tagging salmon from a small boat used to patrol the nets.

A fleet of 60 drift nets, each 25 fathoms long, was provided jointly by D.A.F.S. and M.A.F.F. This fleet consisted of ten nets in each of three mesh sizes (120mm, 130mm and 150mm stretched mesh) and in each of two materials (monofilament and polyfilament nylon). Severe tangling problems were experienced with the polyfilament nets and their use was discontinued after the first few days fishing.

The nets were usually shot just before dawn and were hauled at, or just before, dusk. During daylight they were patrolled at regular intervals by a tagging team in a rubber boat, any fish suitable for tagging being carefully removed from the net by cutting the appropriate meshes, tagged in the rubber boat and released some distance from the nets.

This programme extended from 10th September to 14th October but, due to unavoidable delays in effecting repairs following damage to the ship's propeller on 19th September, fishing was only possible on thirteen days. Before this accident, nets were fished on five days, twice near Torqussaq (about 45 n.m. north of Godthåb) and on three days in the mouth of Diskofjord (about 69°30'N). After the propeller had been repaired, the 'Adolf Jensen' fished for eight days in the mouth of Graedefjord, about 55 n.m. south of Godthåb. Because of earlier difficulties with the polyfilament nets, only the 30 monofilament nets were fished at Graedefjord. Despite these limitations, very useful experience of operating drift nets and of tagging salmon from them was gained.

In all, 348 salmon were caught, of which 105 (30%) were tagged and released. Details of the numbers of salmon caught and tagged daily are given in Table 1.

The proportion of taggable fish in the catch was influenced by weather conditions and by the length of time during which the fish remained in the net before inspection. During five days fishing north of Godthåb, when winds were often strong and when the nets were fished overnight without inspection on two occasions, 197 salmon were caught but only 22 (11%) were tagged. On the other hand, in the comparatively sheltered conditions at the mouth of Graedefjord, where the nets were only fished during the day, 152 salmon were caught and 84 (55%) were tagged.

Although stronger winds usually coincided with better catches, it was clear that, in terms of taggable fish, any apparent advantage gained by increased catches could be outweighed by the reduction in the proportion of taggable fish in the catch, due to damage to fish in the nets. The optimum conditions for obtaining the maximum numbers of taggable fish are, therefore, likely to occur at a wind strength and sea condition considerably less than that at which it would cease to be possible to work drift nets. While wind speeds above about F4 made tagging in the rubber boat more difficult, experience gained during this experiment suggests that the tagging rate is likely to fall to near zero at wind speeds below these which would preclude operations from a rubber boat.

Because of handling difficulties with the polyfilament nets, no worthwhile conclusions could be reached on their efficiency but, for the monofilament nets, analysis of the catch for each mesh size (Table 2) indicated that, while all mesh sizes used caught worthwhile numbers of salmon, 130mm. mesh nets gave the best overall catch/unit effort and also provided the best result in terms of taggable fish/net/day.

The length frequency distribution in the catch (Table 3) was very similar to that recorded in previous years and the average length of all fish (66.0cm.) and average weight of the untagged fish (3.4kg.) were both within the ranges recorded in previous years. A comparison of the length frequency distribution in the catches made north and south of Godthåb confirms the reports by commercial fishermen that catches in the north contain a higher proportion of larger fish.

A comparison of the length frequency distribution in the catch for each mesh size (Table 4) indicates that, as expected, there was a relationship between mesh size and the average length of the fish caught. However, all the mesh sizes used caught significant numbers of fish in the main size groups of fish represented.

The age composition in the total sample is given in Table 5 and, as in net catches in previous years, it shows a strong predominance of one-sea-winter fish and of fish which migrated as two or three-year-old smolts. A comparison between the sea age composition of the catches from the three areas fished (Table 6), confirms that the presence of larger fish in the Disko area was due to the presence of a higher proportion of older fish there, 5% of the catch at Disko being of two- or three-sea-winter fish, as compared with 1% or less further south.

As in previous years, the sex ratio (1 male:3.1 females) was heavily biased in favour of females.

A total of 243 stomachs was examined. Details of the analysis of stomach contents (Table 7) indicates that capelin and sandeels were again the dominant food organisms present although invertebrates were recorded from almost 25% of the stomachs examined.

One salmon, tagged as a hatchery-reared smolt in Maine in May 1970, was recaptured in Diskofjord and released after re-tagging. To date, two local recaptures of fish tagged during this experiment have been reported by commercial fishermen. One was recaptured after an absence of only one day at Graedefjord; the other, which was tagged at Diskofjord, was recaptured about a month later but the method and place of recapture are not known.

Table 1

Date	Wind Force	Sea Condition	Number Caught	Number Tagged	Percentage Tagged	Remarks
<u>North of Godthåb^a</u>						
September 11	1-2	0-1	5	4	80.0	Daylight only
12	4	4	68	0	0.0	Nets left in previous night
15	2	2	30	6	20.0	Daylight only
16	0-6	1-5	25	11	44.0	Nets patrolled till midnight
17	5-6	4-5	68	0	0.0	Nets left in previous night
September 11-17			196	21	10.7	
<u>Mouth of Graedefjord</u>						
October 7	0-2	2	27	11	40.7	Daylight only
8	0-1	2-3	4	3	75.0	Daylight only
9	1-2	0	31	21	67.7	Daylight only
10	2-4	1-3	15	1	6.7	15 nets left in previous night
11	0-3	0-2	8	5	62.5	Daylight only
12	1-4	2-3	31	19	61.3	Daylight only
13	1-3	1-3	30	21	70.0	Daylight only
14	0-1	1-2	6	3	50.0	Daylight only
October 7-14			152	84	55.3	
Overall			348	105	30.2	

^a September 11 & 12 - Off Tovqussaq.
September 15 - 17 - Mouth of Diskofjord.

Table 2

Period	Monofilament Nets					
	No. Caught/Net/day			No. Tagged/Net/Day		
	120mm	130mm	150mm	120mm	130mm	150mm
September 11-17	1.06	1.08	1.12	0.14	0.18	0.08
October 7-14	0.64	0.89	0.45	0.28	0.50	0.31
Overall	0.80	0.97	0.71	0.22	0.37	0.22

Table 3

Period	No. in Sample	Percentage Fork Length Frequency Distribution (cm)								Average Length (cm)
		50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	
September 11-17	195	-	11.8	25.6	39.0	18.0	3.1	1.0	1.5	66.2
October 7-14	152	0.7	9.9	30.9	33.6	23.0	2.0	-	-	65.7
Overall	347	0.3	10.9	27.9	36.6	20.2	2.6	0.6	0.4	66.0

Table 4

Mesh Size (mm)	No. in Sample	Percentage Fork Length Frequency Distribution (cm)								Average Length (cm)
		50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	
120	104	-	17.3	26.0	35.6	19.2	1.9	-	-	65.1
130	118	0.8	10.2	38.1	28.0	19.5	1.7	0.8	0.8	65.5
150	92	-	3.3	18.5	47.8	23.9	4.4	1.1	1.1	67.6

Table 5

Smolt Age	Percentage Age Composition				Overall
	1	2	3	Prev. Spawners	
1	10.3	-	-	-	10.3
2	44.5	0.9	-	-	45.4
3	29.3	0.6	-	-	29.9
4	8.3	-	0.3	0.3	8.9
5	4.0	-	-	-	4.0
6	0.3	-	-	-	0.3
7	1.2	-	-	-	1.2
Overall	98.0	1.4	0.3	0.3	

Table 6

Sea Age	Percentage Sea Age Composition		
	Graedefjord (63°17'N)	Tovqussan (64°53'N)	Diskofjord (69°30'N)
1SW	98.7	-	95.1
2SW	0.7	0.0	4.1
3SW	0.0	0.0	0.8
Prev. Spawners	0.7	0.0	0.0
No. in Sample	152	73	123

Table 7

No. of stomachs examined	243
No. of empty stomachs	26 (10.7) ^a
No. containing:	
a) Vertebrates	199 (81.9)
Sandeel (<i>Ammodytes</i> spp.)	111 (45.6)
Capelin (<i>Mallotus villosus</i>)	90 (37.0)
Scorpion Fish (<i>Cottus</i> spp.)	4 (1.6)
Polar Cod (<i>Boreogadus saida</i>)	1 (0.4)
Unidentifiable fish remains	34 (14.0)
b) Invertebrates	56 (23.0)
Amphipods	34 (14.0)
Euphausiids	21 (8.6)
Polychaetes	12 (4.9)
Squid	1 (0.4)

^a Percentage of number of stomachs examined.