INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

RESTRICTED

Serial No. 2548
(B.g.14)

ICES/ICNAF Salmon Doc. 71/22
(also ICNAF Res.Doc. 71/78)

ANNUAL MEETING - JUNE 1971

The Length, Weight and Age Composition of the Commercial Catches from the Rivers Tweed, Tay and Spey in 1970

by

W.R. Munro and I.J.R. Hynd

D.A.F.S., Pitlochry.

During 1970, regular sampling of the commercial net and coble catches on these three rivers was repeated along the same general lines as in 1969, representative samples being taken from the catches during each half of each month throughout the commercial fishing season.

In 1969, catches were, in general, sampled on one day or on two consecutive days during each half of the month and, during 1970, this pattern was again followed on the River Spey throughout the season and on the Rivers Tweed and Tay until the end of May. On the latter two rivers, from June until the end of the season, catches were sampled on two separate days about a week apart, during each half of the month, as it was considered that this arrangement would provide a sample more representative of the large catches (between 10,000 and 30,000 fish per month), which are recorded on these two rivers during the peak of the grilse run.

As a result of the altered sampling arrangements on the Tweed and Tay from June onwards, the total number of scale samples taken in 1970 rose to 3549, compared with 2798 in 1969. The samples taken from the Tay and Tweed represented between 2% and 5% of the total catch for these fisheries while, on the Spey, they amounted to nearly 10% of the catch. Details of the numbers of fish examined monthly are given in Table 1.

These samples were analysed in the same way as those taken in 1969 and the results are submitted in Tables 2-6 in the same form as in the report on the 1969 samples.

The samples taken on the Tweed and Tay in 1968 and reported on in ICES/ICNAF Salmon Doc. 69/2, were too limited for the results to be strictly comparable with those for the samples taken in 1969 and 1970 and the former have, therefore, been omitted from the comparisons of smolt age composition and sea age composition made in Tables 7 and 8 respectively.

The distribution of smolt age (Table 7) was broadly similar in both years, with the expected tendency for one- and two-year-old smolts to feature more prominently on the Tweed than on the Tay and Spey, where three-year-old smolts account for almost 25% of the catch.

The most obvious difference between the sea age composition (Table 8) in these two years, is the higher proportion of grilse estimated to be present in the catch for each river in 1969. This result is in agreement with the exceptionally high proportion of grilse reported in the Scottish catch in 1969, when the grilse catch was the highest recorded since full statistics became available in 1952.

Because of the differing proportion of grilse in the catches in these two years, it is difficult, from Table 8, to make a direct comparison of the sea age composition of the salmon component in these catches and this comparison is, therefore, provided in Table 9. It is clear from this table that most of the salmon return to these rivers after their second winter in the sea.

Table 10 gives the weight characteristics of the grilse in the samples taken in 1970 and compares the average weights and percentages of grilse over the

appropriate weight limit[a] in the latter, with those for corresponding periods in 1969. In almost every case the average weight of grilse was greater at the corresponding period in 1969, and this trend is reflected in the higher proportion of 'over-weight' grilse recorded in virtually every bi-monthly sample in 1969 and in the greater overall average weight of grilse on each river in 1969.

In 1969, there was evidence that substantial numbers of grilse were included in the reported salmon catch on each river and the size of this error was attributed to an exceptionally large run of unusually large grilse in that year. In 1970, both the average weight and the number of grilse in the runs were, apparently, more normal and this is reflected in a reduction in the difference between the percentage of grilse reported in the catches and that estimated to be present on the basis of the catch samples (Table 11).

The percentage of grilse estimated to be present in the reported salmon catches on each river in 1969 and 1970 are compared in Table 12. From this table, it is clear that a substantial reduction in the error due to the inclusion of 'over-weight' grilse in the salmon catch is likely to have occurred in 1970; the smallest calculated error being on the Spey, where the weight limit is 9lb. and the largest, on the Tay, where the weight limit is 8lb. and where grilse are consistently heavier than on the other two rivers (Table 10).

In their second report (Report of the ICES/ICNAF Joint Working Party on North Atlantic Salmon, 1968. International Council for the Exploration of the Sea, Cooperative Research Report, Series A, No. 12, 18pp. (1969)) the Joint Working Party recommended that member countries should attempt to provide information on the age composition of their catches and on the length, weight and sex ratio of the fish caught. The results of the analysis of the catch samples from the Rivers Tweed, Tay and Spey in 1969 and 1970, together with those for the North Esk (reported separately), are submitted as a contribution towards meeting this recommendation for the Scottish catch. While it has been possible to sample only four rivers in Scotland, it is felt that the results from these should provide a useful indication of these parameters for the Scottish catch, because the net and coble catch on these four rivers, which has varied from about 100,000 to 200,000 fish annually, between 1965 and 1969, accounted for between 28% and 38% of the Scottish catch during that period.

---

a Weight Limits: R. Tweed - 6lb. to 26th June, 7lb. to 7th July, 8lb. thereafter.
R. Tay - 8lb. throughout grilse season.
R. Spey - 9lb. throughout grilse season.

Table 1 Sampling Details

Month	Number in Sample		
	R. Tweed[a]	R. Tay[b]	R. Spey[c]
February	66	40	23
March	111	66	49
April	138	124	154
May	225	172	198
June	199	302	147
July	339	279	167
August	317	195	82
September	156	-	-
Totals	1551	1178	820

a Commercial netting season - 15th February to 14th September
b Commercial netting season - 5th February to 20th August
c Commercial netting season - 11th February to 26th August

Table 2 Estimated Monthly Percentage Sea Age Composition

Sea Age	February	March	April	May	June	July	August	September
R. Tweed								
1+	-	-	-	0.3	4.4	79.4	82.6	74.4
2	98.5	95.7	84.8	24.9	9.5	0.2	-	-
2+	-	-	13.7	73.6	84.4	20.4	17.2	24.4
3	1.5	4.3	1.4	1.2	-	-	-	-
3+	-	-	-	-	1.3	-	-	1.3
Prev. spawners	-	-	-	-	0.4	-	0.2	-
R. Tay								
1+	-	-	-	0.6	19.1	79.7	93.1	-[a]
2	86.6	75.3	55.6	13.3	0.9	-	-	-
2+	-	3.0	35.3	82.6	77.0	19.9	16.2	-
3	13.4	20.5	7.8	0.6	0.4	-	-	-
3+	-	-	1.3	2.3	2.1	0.3	-	-
Prev. spawners	-	1.2	-	0.6	0.5	-	0.6	-
R. Spey								
1+	-	-	-	1.3	49.0	88.2	87.4	-[a]
2	95.7	78.9	61.7	12.9	0.9	-	0.7	-
2+	-	-	23.1	78.8	48.2	10.9	11.9	-
3	4.3	21.1	13.9	3.3	1.4	-	-	-
3+	-	-	0.7	3.3	0.5	0.5	-	-
Prev. spawners	-	-	0.6	0.4	-	0.5	-	-

a Season ends in August.

Table 3 Estimated Percentage Age Composition of Total Catch

Smolt Age	Sea Age 1+	2	2+	3	3+	Prev. spawners	Overall
R. Tweed							
1	2.0	0.1	0.9	-	-	-	2.9
2	60.8	7.7	20.9	0.2	0.1	0.1	89.8
3	6.2	0.4	0.7	<0.1	<0.1	-	7.3
Overall	69.0	8.2	22.4	0.2	0.1	0.1	
R. Tay							
1	2.4	-	0.6	<0.1	<0.1	-	3.0
2	51.6	2.0	18.9	0.4	0.2	0.3	73.4
3	17.1	1.1	4.3	0.2	0.2	-	22.8
4	0.4	0.2	0.2	-	-	<0.1	0.8
5	<0.1	-	-	-	-	-	<0.1
Overall	71.4	3.3	24.0	0.6	0.4	0.3	
R. Spey							
1	-	-	0.7	-	0.1	-	0.7
2	51.3	1.9	18.2	0.6	0.1	0.3	72.3
3	20.6	1.1	2.1	0.2	0.4	-	24.4
4	1.8	0.3	0.3	0.1	-	-	2.5
5	-	-	<0.1	-	-	-	<0.1
Overall	73.7	3.2	21.3	0.9	0.6	0.3	

Table 4 Average Fork Length (cm.) for each Age Class in Sample

Smolt Age	Sea Age 1+	2	2+	3	3+	Previous Spawners
R. Tweed						
1	66.1 (17)	74.3 (2)	76.7 (23)	-	-	-
2	64.0 (526)	71.9 (340)	76.6 (527)	85.2 (7)	86.0 (4)	89.0 (2)
3	66.3 (55)	72.4 (22)	77.2 (23)	89.0 (2)	90.0 (1)	-
Overall	64.2 (598)	71.9 (364)	76.6 (573)	86.1 (9)	86.8 (5)	89.0 (2)
R. Tay						
1	67.9 (10)	-	79.4 (11)	83.0 (1)	83.0 (1)	-
2	63.2 (265)	72.6 (108)	80.6 (355)	92.4 (23)	97.5 (8)	81.7 (3)
3	63.0 (124)	73.9 (57)	78.8 (169)	88.8 (9)	99.6 (5)	-
4	62.8 (5)	74.4 (10)	78.1 (12)	-	-	92.0 (1)
5	56.0 (1)	-	-	-	-	-
Overall	63.2 (405)	73.1 (175)	80.0 (547)	91.1 (33)	97.2 (14)	84.2 (4)
R. Spey						
1	-	-	76.0 (5)	-	99.0 (1)	-
2	62.7 (194)	73.3 (107)	77.6 (225)	88.8 (24)	93.7 (3)	82.3 (3)
3	60.1 (83)	72.2 (63)	75.0 (48)	86.9 (15)	102.8 (6)	-
4	57.1 (8)	71.4 (18)	77.0 (8)	98.0 (1)	-	-
5	-	-	77.0 (1)	-	-	-
Overall	64.8 (285)	72.7 (188)	77.1 (287)	88.3 (40)	99.7 (10)	82.3 (3)

Figures in brackets denote the numbers of fish involved.

Table 5 Average Weight (Kg) for each Age Class in Sample

Smolt Age	Sea Age 1+	2	2+	3	3+	Previous Spawners
R. Tweed						
1	3.3 (17)	4.4 (2)	4.8 (23)	-	-	-
2	2.9 (526)	3.9 (340)	4.9 (527)	6.4 (7)	6.9 (4)	7.1 (2)
3	2.6 (55)	3.9 (22)	4.9 (23)	7.4 (2)	6.5 (1)	-
Overall	2.9 (598)	3.9 (364)	4.9 (573)	6.7 (9)	6.8 (5)	7.1 (2)
R. Tay						
1	3.2 (10)	-	5.5 (11)	5.2 (1)	5.2 (1)	-
2	3.2 (265)	3.9 (108)	5.7 (355)	8.0 (23)	10.1 (8)	6.2 (3)
3	2.8 (124)	4.2 (57)	5.2 (169)	7.5 (9)	11.3 (5)	-
4	2.8 (5)	4.2 (10)	4.9 (12)	-	-	7.6 (1)
5	2.0 (1)	-	-	-	-	-
Overall	3.0 (405)	4.0 (175)	5.5 (547)	7.8 (33)	10.2 (14)	6.5 (4)
R. Spey						
1	-	-	4.9 (5)	-	11.3 (1)	-
2	2.8 (194)	4.3 (107)	5.1 (225)	7.5 (24)	8.8 (3)	6.8 (3)
3	2.4 (83)	4.0 (63)	4.7 (48)	7.0 (15)	11.9 (6)	-
4	2.1 (8)	3.8 (18)	4.8 (8)	10.0 (1)	-	-
5	-	-	4.5 (1)	-	-	-
Overall	2.6 (285)	4.2 (188)	5.0 (287)	7.4 (40)	10.9 (10)	6.8 (3)

Figures in brackets denote the numbers of fish involved.

Table 6 Average Weight (Kg) for each Sea Age Group in Sample

River	1 Sea Winter	2 Sea Winters	3 Sea Winters	Previous Spawners
Tweed	2.9 (598)	4.5 (937)	6.7 (14)	7.1 (2)
Tay	3.0 (405)	5.1 (722)	8.5 (47)	6.5 (4)
Spey	2.6 (285)	4.7 (475)	9.1 (50)	6.8 (3)

Figures in brackets denote the number of fish involved.

Table 7 Estimated Smolt Age Composition in Total Catch

River	Year	Smolt Age 1	2	3	4	5
Tweed	1969	3.9	92.0	3.8	-	-
	1970	2.9	89.8	7.3	-	-
Tay	1969	1.9	74.7	22.3	0.7	-
	1970	3.0	73.4	22.8	0.8	<0.1
Spey	1969	1.6	77.8	19.0	1.4	-
	1970	0.7	72.3	24.4	2.5	<0.1

Table 8 Estimated Sea Age Composition in Total Catch

River	Year	Sea Age 1+	2	2+	3	3+	4	Previous Spawners
Tweed	1969	36.0	1.6	11.6	0.3	0.1	<0.1	0.1
	1970	69.0	8.2	22.4	0.2	0.1	-	0.1
Tay	1969	77.1	2.2	18.6	1.2	0.2	<0.1	0.3
	1970	71.4	3.3	24.0	0.6	0.4	-	0.3
Spey	1969	86.9	2.0	8.0	2.1	0.4	<0.1	0.7
	1970	73.7	3.2	21.3	0.9	0.6	-	0.3

Table 9 Estimated Sea Age Composition in Salmon (only) Catch

River	Year	Sea Winters 2	3	4	Previous Spawners
Tweed	1969	96.1	2.8	0.1	1.0
	1970	98.5	1.2	-	0.3
Tay	1969	91.1	7.2	0.2	1.5
	1970	95.5	3.5	-	1.0
Spey	1969	76.1	18.6	<0.1	5.2
	1970	93.2	5.6	-	1.2

Table 10

Characteristics of Grilse in Catch Samples - 1970

Period		R. Tweed			R. Tay			R. Spey		
		Average Weight (lb)	Weight Range (lb)	Percentage over Weight Limit	Average Weight (lb)	Weight Range (lb)	Percentage over Weight Limit	Average Weight (lb)	Weight Range (lb)	Percentage over Weight Limit
May	16-31	3.5 (3.9)	-	0.0 (0.0)	5.0 (4.6)	-	0.0 (0.0)	4.0	2.0 - 6.0	0.0
June	1-15	4.6 (5.0)	-	0.0 (14.3)	4.9 (5.8)	4.4 - 6.4	0.0 (0.0)	4.7	3.0 - 7.0	0.0
	16-30	4.1 (5.8)	3.1 - 5.6	0.0 (6.6)	5.3 (6.3)	2.9 - 8.3	5.9 (2.1)	5.0 (5.8)	3.0 - 6.5	0.0 (0.0)
July	1-15	5.3 (6.2)	3.6 - 7.0	1.6 (3.9)	5.8 (6.8)	2.8 - 9.1	6.7 (10.2)	5.5 (6.6)	3.0 - 10.5	3.3 (5.5)
	16-31	5.6 (7.2)	2.8 -11.0	4.7 (15.2)	6.7 (7.6)	3.8 -12.0	26.4 (38.6)	6.2 (6.6)	2.6 - 9.6	4.8 (7.1)
August	1-15	6.3 (7.0)	2.6 -10.3	12.9 (29.7)	7.6 (7.9)	3.8 -15.4	34.5 (36.1)	6.4 (6.9)	4.0 - 11.5	8.5 (12.3)
	16-31	6.5 (7.4)	3.0 -12.8	19.7 (32.5)	7.6 (7.7)	4.4 -11.0	33.3 (29.5)	6.6 (6.6)	4.0 - 10.0	7.7 (10.5)
September	1-14	7.9 (8.9)	2.6 -13.4	47.4 (60.5)	-	-	-	-	-	-
Overall		6.1 (7.1)[a]			7.0 (7.4)[a]			5.9 (6.9)[a]		

Figures in brackets give the corresponding values for 1969

a Weighted average based on the numbers of grilse caught during each bi-monthly period.

D8

Table 11 Percentage of Grilse in Catch - 1970

Month	R. Tweed		R. Tay		R. Spey	
			Based on:			
	Commercial Returns	Catch Samples	Commercial Returns	Catch Samples	Commercial Returns	Catch Samples
May	0.8 (12.9)	0.3 (14.4)	0.9 (1.2)	0.6 (1.6)	4.2 (7.8)	1.3 (7.8)
June	5.0 (55.6)	4.4 (67.1)	16.4 (36.6)	19.1 (40.6)	44.8 (66.8)	49.0 (73.3)
July	80.6 (86.1)	79.4 (96.1)	66.6 (65.4)	79.7 (87.6)	87.3 (88.6)	88.2 (94.1)
August	71.3 (62.0)	82.6 (87.2)	58.7 (38.8)	83.1 (81.5)	83.5 (82.7)	87.4 (95.1)
September	40.1 (30.3)	74.4 (72.4)	-	-	-	-
Overall	62.8 (68.2)	69.0 (86.3)	56.0 (51.4)	71.4 (77.2)	72.0 (80.0)	73.7 (86.9)

Figures in brackets give the corresponding values for 1969.

Table 12 Estimated Percentage of Grilse in Reported Salmon Catch

River	1969	1970
Tweed	56.8 (20.9)	16.5 (8.9)
Tay	57.0 (33.4)	35.1 (21.6)
Spey	34.6 (8.0)	5.9 (2.2)

Figures in brackets give the percentage of the estimated grilse catch estimated to be included in the reported salmon catch.