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Returns of Salmon
to the Kollafjörður Fish Farm in 1974

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to the Kollafjörður Fish Farm in 1974

by

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Introduction.

The Kollafjörður Fish Farm is located on the Kollafjörður inlet about 22 kilometers north of Reykjavík, Iceland. The Fish Farm is very well suited for the release of hatchery smolts, having an outflow directly into the sea and complete control over the returning fish. The downstream migrants have been tagged with dangler type tags for many years and the results from these experiments are discussed by Guðjónsson (1970) and Ísaksson (1973). The following report is just a summary of this year's results and will be published in more detail at a later date.

The Smolts Tagged.

Out of 12 lots of fish that were released from the Fish Farm in 1973 there were 6 consisting of two-year-smolts; 5 lots of one-year-smolts and 1 group of one and two-year-smolts that were released from a floating pen located on a salt water lagoon in the middle of October. The total number of tagged two-year-smolts was 6000. The number of one-year-smolts tagged was 2800 and additional 2300 were adipose clipped. Only 430 smolts were released from the floating pen.

1. Two-year-smolts.

Using two-year-smolts, comparisons were made between Carlin tags with conventional steel wire, Carlin tags with polyethylene attachment, and plastic tags with polyethylene attachment from

Neil and sons in England. The progeny of grilse were compared with the progeny of older salmon to see whether any inherited differences in age of return would show up.

One group of two-year-smolts was cold branded with an X on the left side in addition to a Carlin tag so that the returning fish could be checked for the visibility of the brand. The branding equipment used was similar to the one described by Mighell (1969). Branding time was approximately 2 seconds.

2. One-year-smolts.

The one-year-smolts released from Kollafjörður Fish Farm in 1973 had been subjected to a natural photoperiod through a transparent roof for 35 weeks. The temperatures were kept relatively high except for a period of 2 months in Jan.-Feb. of 1973 when the natural temperatures were used to imitate winter conditions. The photoperiod treatment of one-year-smolts was a continuation of a photoperiod treatment with artificial light performed in 1971-1972 which increased returns of one-year-smolts considerably above previous levels (Isaksson 1973).

The one-year-smolts were all tagged with plastic tags with polyethylene thread made by Neil and sons in England. These fish were subjected to various treatments before their release in 1973. One experimental group was exercised for a period of one month before release. A control group was kept in the same type of rearing unit without exercise. Peterson (1973) has reported increased returns of one-year-smolts in Sweden by giving them fatty diet for a short period before release. One group in the present experiment was fed for a period of one month a modified fatty diet from Fiskfóður h/f, an Icelandic manufacturer of fish feed. The fatty diet was formulated by Dr. Jónas Bjarnason of the Icelandic Fisheries Laboratories. A control group was fed a regular, nonfatty diet from the same producer. In addition to the tagged fish, a large group of one-year-olds was adipose clipped to get an indication of the survival of untagged fish.

Results.

1. Two-year-smolts.

The groups tagged in 1973 and the return of grilse in 1974 are shown in table 1. The returns of two-year-smolts range from 9,3 to 11,6 percent. Since the smolts vary in average length at tagging, apparent differences in return may not be significant. Certain things, however, are clear. There is no significant difference in the returns of group 3, being the progeny of grilse, and group 5, being progeny of older fish. This support previous observations at the Fish Farm. There does not seem to be any significant difference between the English plastic tag and the Swedish Carlin tag, comparing groups 2 and 6. Group 1 having a modified Carlin tag with polyethylene thread does seem to have a better return rate than the regular Carlin tag (group 2).

The fish in group 7 were inspected for cold brands upon their return. Out of 77 fish that were inspected only 38% of the brands could be easily seen and 62% were poorly or not visible. It should be noted that the double marking and handling of the fish did not affect their return-rate.

2. One-year-smolts.

The returns of one-year-smolts range from 6,6 to 10,6 percent. These fish were fairly uniform in size at tagging and can be easily compared. If groups 8 and 9 are compared there does not seem to be any beneficial effect from the exercise that the fish in group 8 were subjected to.

The difference between fish fed a fatty diet and nonfatty diet does seem to be significant. The fish on the fatty diet (group 11) are not returning as well as the fish on the nonfatty diet (group 10). This is not surprising since data from wild steelhead smolts indicate a lowering of fat content during smoltification (Fessler and Wagner 1969) and it is not unreasonable to assume the same for Atlantic

salmon.

The adipose clipped smolts had a record return rate of 14,8 %. Since adipose clipping is the least detrimental method of marking, it is probably a very good indicator of the return rate of untagged fish to get the ratio of tagged to untagged. This group should be compared to group 10 since both were subjected to the same conditions until released. This comparison indicates that approximately 1,4 untagged salmon return for each tagged salmon. This is the lowest ratio ever obtained at the Fish Farm indicating very successful tagging and/or very little tag loss. It should be noted that all fish tagged in these experiments were over 13,5 cm in fork length. The results are thus only representative of smolts in that size category. The return rate of one-year-smolts to the Fish Farm is averaging 8,5% which is 4 times better than the return rate of one-year-smolts in 1973 (Isaksson 1973) which was the best on record at the Fish Farm up to that point.

Group **12** consists of various smolts that were put into a floating pen on a saltwater lagoon in the spring of 1973 for salinity tolerance experiment. The fish were tagged in October when they were released and their sensitivity at that stage may be partly responsible for the inferior return rate in that group. This experiment will be discussed in detail in a later report.

The amount of straying in all groups combined was only 2,4% which is very close to the straying in 1973 (Isaksson 1973) but lower than in earlier experiments (Guðjónsson 1970).

3. The total run.

The total run to the Fish Farm was 3065 fish. Estimates indicate that 2850 of these were returning as grilse. About 1186 of these were marked in some way out of 11.100 released, giving a return rate of 10,7% for tagged and finclipped fish. The number returning unmarked was about 1660. The total release of unmarked smolts was 11,800. This gives about

14% return rate of unmarked fish which is in close agreement with the return rate for adipose clipped fish discussed earlier.

The total number of fish released in 1973 was 23,300. Using the number of grilse returning we get a 12,2% return rate for all fish released in 1973.

A total of 328 kelts were tagged and released in December of 1973. The day after their release very cold weather started with several degree frost which lasted for several days. A thick icesheet was formed on the Kollafjörður inlet and undercooling of the sea water was observed. It was expected that these adverse conditions might reduce the return rate of the kelts. The observed return rate for these fish was 1,2% as compared to 30% for 1973.

References:

- Fessler James L. and
Harry H. Wagner - 1969: "Some Morphological and Biochemical Changes in Steelhead Trout During the Parr-Smolt Transformation", J.Fish.Res.Bd. Canada 26: 2823-2841
- Guðjónsson Þór - 1970: "The Release and Returns of Tagged Salmon at Kollafjörður, Iceland", ICES C.M. 1970/M:6.
- Ísaksson Árni - 1973: "The Results of Tagging Experiments at the Kollafjörður Experimental Fish Farm from 1970 through 1972", ICES C.M. 1973/M:26.
- Mighell Jones L. - 1969: "Rapid Cold Branding of Salmon and Trout with Liquid Nitrogen", J.Fish. Res.Bd. Canada 26: 2765-2769.
- Peterson Hans H. - 1973: "Adult Returns to Date From Hatchery-Reared One-Year-Old Smolts" The International Atlantic Salmon Foundation; Spec.Pub.Ser. 4,(1) :219-226.

TABLE 1. RETURNS OF TAGGED SALMON TO THE KOLLAFJÖRÐUR FISH FARM IN 1974.

GROUP NUMBER	TYPE OF TAG	TREATMENT ATTRIBUTE	AGE AT TAGGING	MEAN LENGTH AT TAGGING cm	NUMBER TAGGED	RETURNS AT KOLLAFJ.	RETURNS OTHER PLACES	TOTAL RETURNS NUMBER	TOTAL RETURNS %
1	Carlin W/polyeth. Attachment	Polyethylene Attachment	2-year	16,2	700	81	0	81	11,6
2	Carlin Wire Attachment	Wire Attachment	2-year	16,3	1300	118	4	122	9,4
3	Carlin Wire Attachment	Progeny of Grilse	2-year	15,5	1000	103	4	107	10,7
5	carlin Wire Attachment	Progeny of 2 yr. Sea-Salmon	2-year	14,8	1000	89	5	94	9,4
6	Plastic Tag W/polyeth. Attachment	Plastic Tag	2-year	16,7	1000	91	4	95	9,5
7	Carlin Wire Attachment	Cold- branding	2-year	16,7	1000	92	1	93	9,3
8	Plastic Tag W/polyeth. Attachment	Exercise	1-year	14,9	700	56	1	57	8,1
9	Plastic Tag W/polyeth. Attachment	No Exercise	1-year	14,6	700	62	0	62	8,8
10	Plastic Tag W/polyeth. Attachment	Nonfatty Feed	1-year	15,2	700	73	1	74	10,6
11	Plastic Tag W/polyeth. Attachment	Fatty Feed	1-year	15,1	700	46	0	46	6,6
12	Plastic Tag W/polyeth. Attachment	Floating Pen	Mixed Ages	18-25,0	430	14	1	15	3,5
13	Adipose Clipped	Untagged	1-year	15,0	2300	340	0	340	14,8