An Roinn Turasoireachta, Iascaigh Agus Foraoiseachta

Capture of sea-trout by illegal means in the Western Fisheries Region

Some observations for discussion

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Circumstances concerning the possible illegal exploitation of sea trout in two western fishery districts in which the fish are an important component of the salmonid catch are reviewed. Legal methods of capture in the districts are described. The illegal fishery consists largely of nets fixed close inshore. The meshings available are described in terms of colour, size, thread width and materials. The meshes belong to one of two size groups. The larger of these is suitable for salmon and only trout of more than four sea winters are likely to be caught in them; these fish are relatively rare on the western seaboard. The group of smaller meshes would be effective in the capture of sea trout and fish of one sea winter would be particularly susceptible. Unfortunately the mesh marks inflicted by such nets would be similar to those made by a draft net, used legally. The greater part of the illegal salmonid fishery is apparently directed at salmon.

INTRODUCTION

The illegal capture of salmon is frequently given prominence but the situation concerning sea trout is not so well documented. This brief review examines some of the evidence available from the Connemara and Ballinakill Fishery Districts of the Western Fisheries Region. In both, sea trout are regarded as a valuable part of the salmonid catch. Because the evidence concerning the illegal exploitation of sea trout is largely circumstantial, the approach will be to investigate the kinds of gear in use and their likely impact on the fish.

NETTING REGULATIONS

Bye-law number 546 dated 28 May 1969 fixes the minimum size for the mesh used in salmon drift nets at 2.5 inches knot to knot (25.4cm in the round) in the Western Fisheries Region. The regulation was devised to permit the escape of sea trout which are regarded here as primarily anglers' fish. Smaller net meshes may however be used as fixed engines in the Region for species other than salmonids. Should they capture salmonids, the fish must be freed and such nets are liable to forfeiture if they are found to contain salmon or trout.

Draft nets are legally used in the Ballinakill District. They operate by enclosing rather than enmeshing fish. Draft nets contain several panels of webbing, the outermost, or leaders, having larger meshes than the wings. The smallest are in the central panel or bunt which retains the fish when the net is brought ashore. It is the bunt meshing which determines the size of the salmonids captured. The minimum mesh size of a salmon net allowed under the Fisheries Acts is 7 inches (17.8cm) in the round except where a smaller mesh size is permitted by local bye-law. There are thirteen such bye-laws in existence at present and their revocation is being considered.

MESHES IN USE IN CONNEMARA

Details of gear accumulated over three years and examined in Connemara are set out in Table 1. The materials used are listed, and mesh sizes and thread widths are given. The nets are made up of two main categoriese of fibre: plastic monofilament nets made of nylon or polypropylene and multifilament fibres containing a vartiety of materials of which nylon is one.

The colours of the materials ranged through various pale (paler in the monofilament) shades of green, brown, yellow and grey. It is likely that some of these were the result of denaturation following exposure to sunlight.

Type of fibre	Colour	Mesh size (2 x length) (mm) Ply	Average	S.D.	S.D./ average	Thread width (mm) Average	S.D.	S.D./average	Material
multi.	light green	3	12.4	0.074	0.006	0.839	0.036	0.043	2
mono.	light green	1	12.8	0.076	0.006	0.634	0.011	0.017	1
multi.	light green	3	12.9	0.123	0.010	0.876	0.044	0.050	1
multi.	white	3	8.3	0.053	0.006	0.524	0.017	0.032	4
multi.	light brown	3	7.2	0.065	0.009	0.476	0.026	0.055	2
mono.	clear	1	7.1	0.055	0.008	0.387	0.009	0.023	1
mono.	clear	10	12.9	0.116	0.009	0.601	0.094	0.156	1
multi.	brown	3	7.3	0.078	0.011	0.448	0.026	0.058	2
mono.	pale green	c 80	12.9	0.108	0.008	0.443	0.030	0.068	1
multi.	white	3	8.3	0.179	0.022	0.496	0.033	0.067	4
multi.	green	3	12.8	0.090	0.007	0.647	0.047	0.073	2
mono.	clear	1	12.3	0.115	0.009	0.661	0.012	0.018	1
mono.	green	1	12.5	0.089	0.007	0.682	0.017	0.025	1
multi.	brown	3	7.6	0.215	0.028	0.630	0.022	0.035	3
multi.	dark green/	3	12.4	0.100	0.008	0.853	0.058	0.068	2
mono.	light grey/ clear	1	12.7	0.044	0.003	0.629	0.012	0.019	1
multi	grey	3	7.3	0.166	0.023	0.416	0.012	0.029	2
mono.	clear	1	6.8	0.062	0.009	0.382	0.004	0.010	1
multi.	green	3	12.9	0.090	0.007	0.775	0.025	0.032	1
mono.	pale yellow	1	11.3	0.110	0.010	0.617	0.009	0.015	1
mono.	sea green	1	12.6	0.067	0.005	0.612	0.013	0.021	1

Table 1 Characteristics of meshing from confiscated illegal fishing nets in the Connemara Fishery District. The measurements are based on ten readings in each sample. The mesh size is measured obliquely across the square (the x, or bar measurement, is equivalent to the knot to knot measurement. Twice the 2 x measurement gives the mesh in the round .

Materials identified are:- 1, Nylon (Polyamide) 6; 2, Nylon (Polyamide) 6,6; 3, Cotton; 4, Polypropylene

Mesh sizes in Table 1 are expressed as measured diagonally across the mesh square. Twice the diagonal is the mesh perimeter. Two size groups were in use:

the smaller, 13.6 - 16.6 cm in the round
the larger, 22.6 - 25.8 cm in the round

The larger meshing was in far greater abundance than the smaller. Among the confiscated nets in Connemara (approximately 200 engines) smaller meshes are estimated to have constituted about 10%.

In freshwater all these nets are illegal. In marine waters the larger mesh sizes could be used legally to capture salmon by drifting. Meshes smaller than 25.4cm in the round could legally be used for a variety of marine species, from mullet to mackerel or herring. All of the nets could be used as fixed engines for the clandestine capture of salmonids; used as meshing rather than enclosing nets they would be size selective.

THE MESHING MECHANISM

Meshing nets retain a captured fish by gripping it in a single mesh. Fig. 1 illustrates a typically marked sea trout. The anterior end of the fish can be visualised as a cone which has its base in the vicinity of the anterior end of the dorsal fin. If the mesh exceeds the girth of the fish at this point, it will not retain the animal. If, on the other hand, the mesh is not sufficiently large to admit the head, then the fish will not wedge in the nets although, if the thread is fine, a fish may tangle with it.

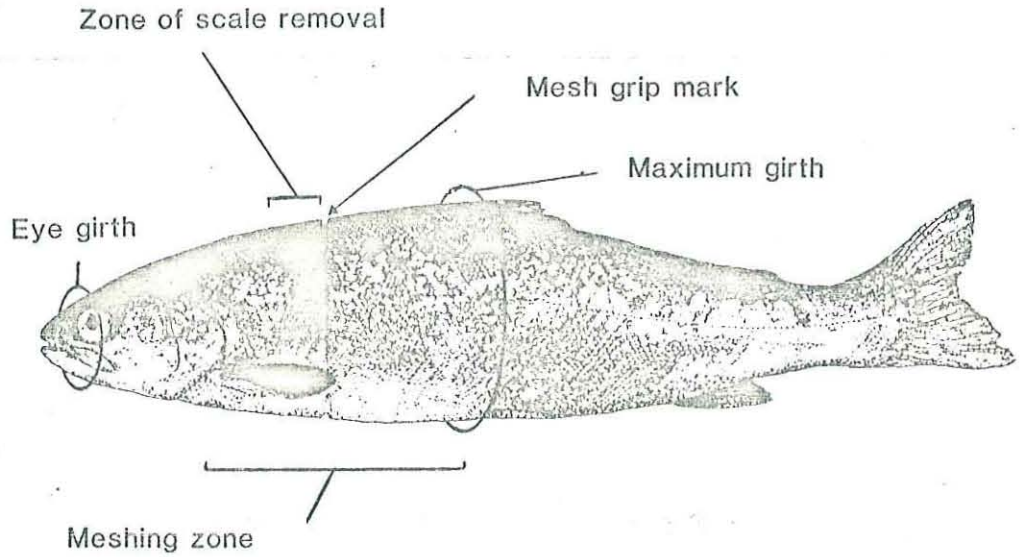

Fig. 1 A typical mesh marked sea trout labelled according to the terminology used in the text. Positioning of the girth measurements is also shown.

The mark left by a mesh is, at the anterior end, typically a patch of scale removal. Towards the posterior margin of this patch the mesh may burn a mesh grip mark indicating where the fish was held. This mark may be discernible as a ring around the body.

Fig. 2, showing the relationship between girth at the eyes and at the anterior end of the dorsal fin and the fork length is drawn from collections of Waterville sea trout. The vertical lines suggest the mean fork lengths of various sea age groups and the shaded areas represent mesh sizes in confiscated gear.

A general rule concerning the operation of meshing nets states that a mesh is most efficient when the maximum girth of the fish is 25% larger than the mesh size. Applying this rule to Fig. 2 the larger group of meshes in operation in Connemara would only take sea trout of four sea summers or more.

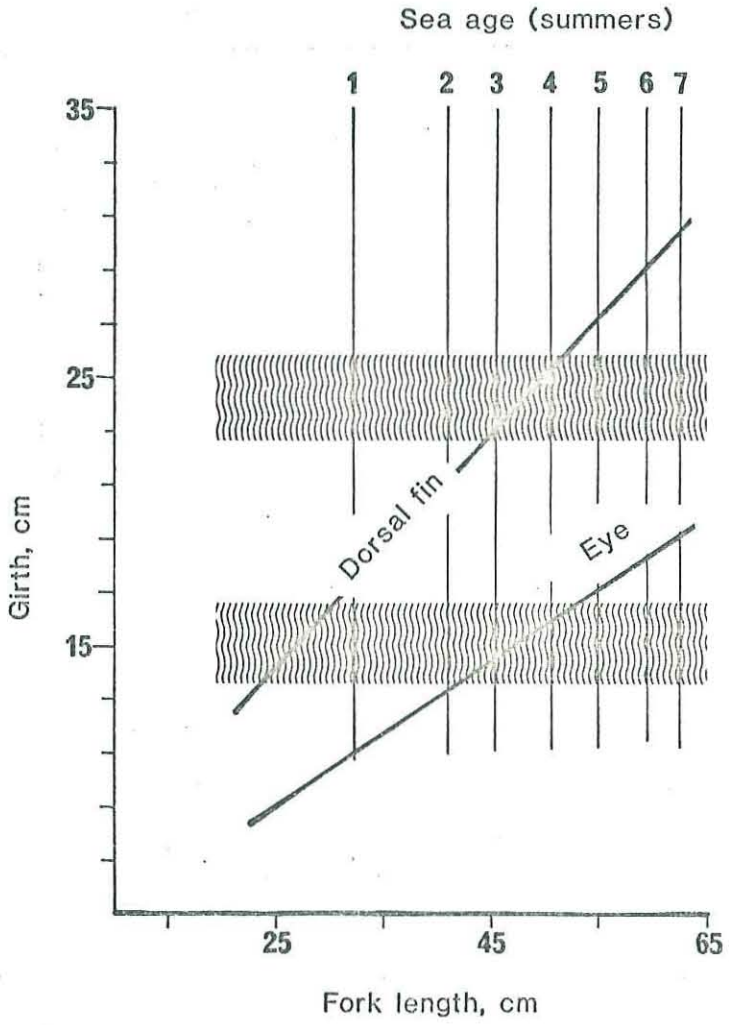

Fig. 2 Relationships between girth at the eyes and at the anterior end of the dorsal fin and the fork length of Atlantic feeding, slim bodied sea trout. Vertical lines mark the approximate fork lengths of various sea age groups. Shading represents the net meshing available in the Connemara Fishery District.

Fig. 3 shows the percentage fork length frequency distribution of sea trout in the tidal waters of the River Moy (E.Fahy, "Sea trout from the tidal waters of the River Moy" Irish Fisheries Investigations A 18,1979). Many of the western sea trout stocks have a similar length frequency distribution, indicating there are few older sea age groups of trout available for capture.

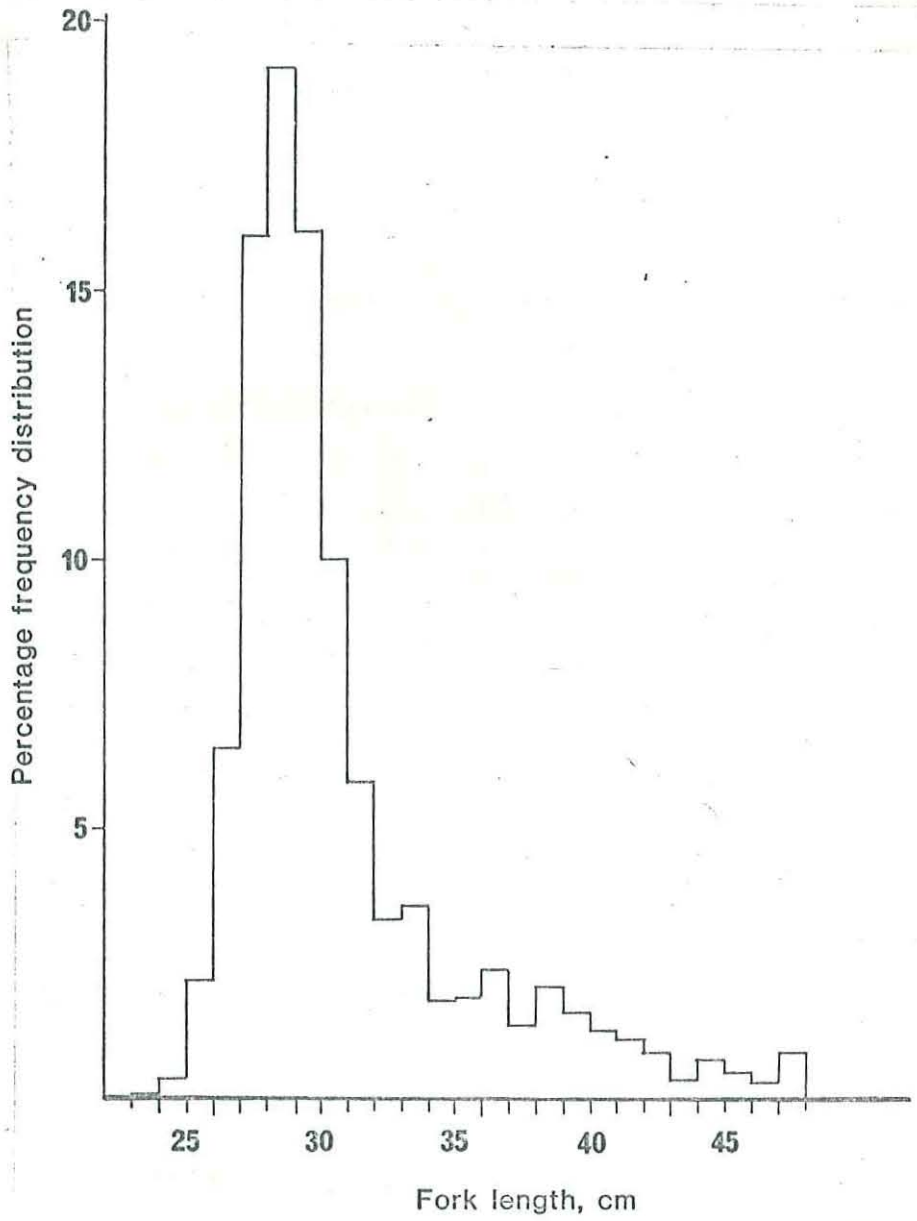

Fig. 3 Percentage length frequency distribution of sea trout taken in draft nets by the Moy Fishery Company (from Fahy, 1979).

The smaller meshes are likely to have the most grave consequences for sea trout stocks on the Atlantic coast. The most vulnerable of the sea groups is the one sea winter trout. The largest of the smaller meshes is 16.6cm in the round and the average maximum girth of one sea winter fish is 21.2cm, about 22% larger.

A CASE HISTORY

In July 1980 two batches of net caught sea trout were examined in Clifden. A number of observations were made on them and these are summarised in Table 2. The following are the conclusions drawn:

Comparison of fork lengths indicates there was no significant difference between the two samples (by t test) ($P < 0.05$).

Mesh mark ranged to a maximum estimate of 19.2cm (or 1.88 inches knot to knot) although the mean value of 17.1cm (1.68 inches knot to knot) is more likely to approximate to mesh size. Measurement of mesh mark requires a judgement of tension exerted on a fish by a mesh hence the variation in these readings.

TABLE 2 Characteristics of two samples of net-caught sea trout; examined Clifden, July 1980.

Characteristics	Sample 1	Sample 2
Fork length (cm)		
mean	37.9	37.9
S.D.	8.38	5.28
Mesh mark		
mean	-	17.1
S.D.	-	1.18
Range	-	16-19.2
Sea age (years)		
mean	1.15	1.04
S.D.	1.19	0.58
% previously spawned	23	18
N	26	28

The sea age was high in both samples, and they were not significantly different (by t test). In keeping with a high sea age the percentage previous spawners in each sample (18 and 23%) was large (the older a sample the more previous spawners it is likely to contain). Both the sea age and percentage previous spawners represent a bias towards older fish and the similarity between the samples suggests they were captured in similar gear.

TENTATIVE CONCLUSIONS

High prices for salmon have encouraged the intensification of legal and illegal fisheries for this species. While it is likely that sea trout are a worthwhile catch for the same reasons evidence of this illegal fishery is sparse.

Being smaller than salmon it is certainly possible that sea trout are captured illegally in great numbers and disposed of with greater ease.

It is probable that a supposedly widespread and intensive fishery for sea trout might owe something to the increasing sale of "sea trout" in restaurants - these being sea-reared rainbow trout Salmo gairdneri

Such evidence as is available from Connemara and Ballinakill, two districts in which sea trout are a major component of the salmonid catch, suggests that the major illegal fishing effort is directed at salmon. A factor complicating the interpretation of mesh marks in Ballinakill is their approximating to the mark left by legally used draft nets.

ACKNOWLEDGEMENTS

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