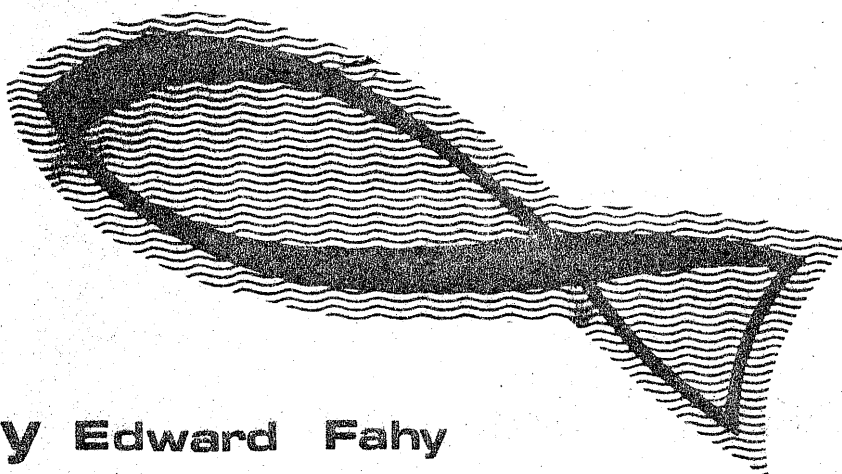




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The sea trout year 1980



by Edward Fahy

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THE SEA TROUT YEAR, 1980

by Edward Fahy

Irish Fishery Leaflet 108, Department of Fisheries & Forestry, Dublin

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FOREWORD

The following pages comprise the first issue of a brief and, hopefully, annual account of research in progress on sea trout, a summary of results recently available and a short account of stocks of this fish during the preceding fishing season with a tentative prognosis for the coming year. The purpose of the report is to inform user groups, anglers and netmen, about the work and to promote an interchange of information with interested parties; a primary objective is the identification of priority research objectives and hence the promotion of better management of fisheries in which sea trout are an important or the only quarry. Comments and requests for additional information should be addressed to the Fisheries Research Centre, Abbotstown, Castleknock, Co Dublin.

The Sea Trout Year, 1980

INTRODUCTION

The fundamental question to which the fishery manager and fisherman wants an answer concerns the state of the stocks and his prospects for the coming season. For any migratory fish this is a difficult query to answer and sea trout are a particularly complicated subject. For one thing the sea trout stock in any fishery consists of two migratory components one of which goes to sea in Spring, the second in the Autumn. For another, the exploitable stock migrates into freshwater over a period of several months and the length/weight/age composition of the run changes from day

to day so that even careful observation of the fish may not provide any more than an indication to their age structure. At the same time it would be unrealistic to attempt a thorough examination of each individual coming into freshwater. The enormous capital expenditure such an exercise would require precludes the operation of more than a handful of such installations in the entire country. In the final analysis we in the Department are dependent on what the captor of the fish is prepared to tell us in appraising the annual catch of sea trout.

As a first step this report will review several impressions of the fishing season and provide such statistical information as is readily available. In any year since official statistics were first prepared in 1927 between 50 and 80% of the total sea trout catch was taken by anglers and we must therefore try to evaluate their very significant contribution to the total. A diary covering the season is the monthly series of summary reports in the Trout and Salmon Magazine which consists of an account of how certain fisheries are performing during the season. An overall impression is that catch-wise 1980 was a reasonable year with better than usual spring landings of slightly larger than average sea trout. While these observations are necessarily vague they contain an essential element of sea trout fisheries; previous studies carried out by the Department suggest that these trout are an excellent quarry because their catches do not undergo such fluctuations as those of other game species, notably salmon, although we have reason to believe that the availability to the angler of sea trout varies considerably from one year to another.

Sea Trout Runs and Climate

While the life histories of salmon and sea trout have much in common they differ in a number of important respects. In Ireland salmon are necessarily migratory, the young stages occupying the rivers before migrating to feed up prior to spawning. Salmo trutta would seem to have an option of remaining as brown trout or running to sea to feed up as "white" trout. Thus, whether trout migrate or not, there would appear to be a resident component to the population which research has shown to be genetically similar to the sea going fish. This is quite different to the position prevailing in salmon where, if a particular year's migration is impaired then the entire salmon population of the river in question may be destroyed in perpetuity.

For many years it has been known that sea trout are produced in cyclic manner; that is, there are bursts of large migrations followed by leaner times. Exactly why these cycles of good and bad years occur has been something of a mystery but early in 1980 a partial explanation for the alternation of good and bad migrations was discovered in the FRC, from an examination of the age of the smolts at migration - and there are a number of papers containing details of this statistic going back to the turn of the century available in the literature. These figures were then associated with certain climatic data to provide a model explaining why certain years are more favourable to large sea trout migrations out of freshwater. This model still needs considerable refinement but the results of the calculations provide a reasonable theory for what has happened in the past and they explain fairly satisfactorily what is happening at present. On the basis of the calculations climatic conditions most favourable to sea trout production seem to be years in which the agricultural growing seasons (for grass) are long. This does not mean that the summers have to be very hot. Indeed very often when the summers are hot the winters are exceptionally cold and the growing seasons are consequently short. Years in which the grass remains growing throughout the winter seem to be best for sea trout production in freshwater and when three such years occur together then the numbers of trout leaving freshwater on their first migration are relatively highest. If however one of the three otherwise favourable years is interrupted by a short or a late or a cold spring - as for example happened in 1979 - then the outcome is a considerable reduction in the output of sea trout running to sea for the first time in that year and the two which follow it. Thus in response to a favourable climatic trend sea trout numbers built up in the mid-seventies but we are now possibly entering a time of reduction in sea trout migrations.

Mr. Tom Keane, of the Agricultural Meteorology Section of the Meteorological Service, writing in the Irish Farmers' Journal of 6th December, 1980, described 1980 as a good growing year. However, the late spring of 1979 and the consequently short growing season may not favour good runs of trout to sea during 1980 and 1981. Therefore the prognosis for this year is that there will be no dramatic increase in the numbers of fish returning to freshwater as post-smolt (this is the smallest of the exploitable age categories known locally as finnock, whitling etc.)

A notional diagram showing trends in the availability of sea trout over the years is presented in Fig. 1.

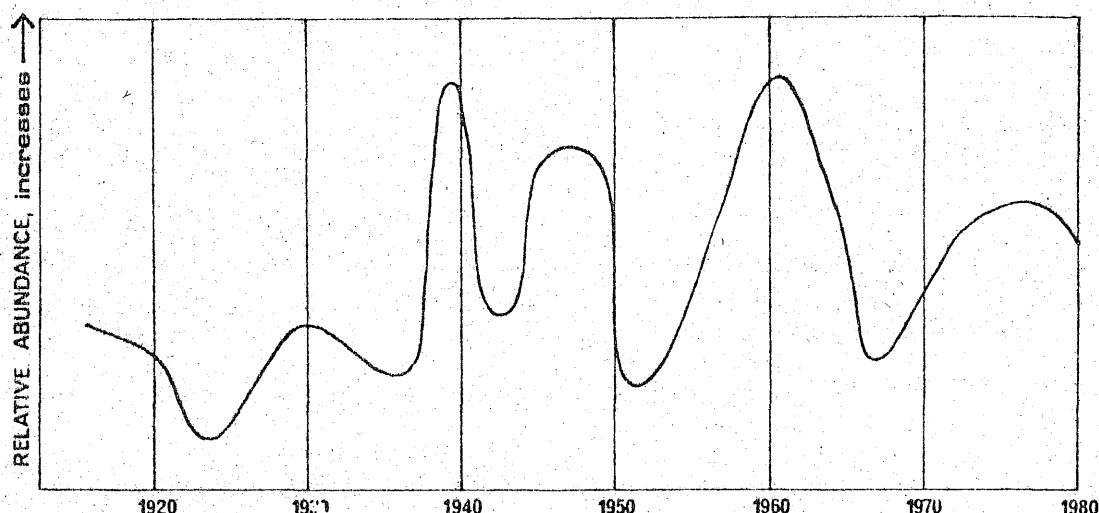


Fig. 1. Notional diagram, based on climatic data, of fluctuations in sea trout abundance since the turn of the century.

The Sea Trout Run in 1980

Consideration of growing season could be a useful way of estimating relative output of sea trout from freshwater.

Various meteorologists, physicists, astronomers have made studies of the growing season which has considerable application in agriculture. There is general agreement that the factors which regulate its duration depend on solar activity. This suggests that information on the growing season applies throughout the country; we can expect that in any year there will not be much variation in it from one part of the country to another. However the angler and the commercial netsman will want more than just theory to explain or to convince him that the growing season is the important factor in sea trout production. Without any doubt the best sea trout counting facilities in Ireland are to be found in the installations of the Salmon Research Trust at Newport, Co. Mayo where the fish are counted as they go to sea. The number of fish returning to freshwater in July forms a large percentage of the total run and consists of fish which went to sea in the previous spring and autumn. (In Irish sea trout fisheries with the single exception of the Waterville fishery the post smolt are the largest part of the anglers and draft net man's catch.) In Fig. 2 I have set out the number of fish making up the two important parts of the migration in the Burrishoole System since the full installations there came into operation in 1970. For the 1980

figures I am indebted to Dr. D.J. Piggins who kindly supplied estimates for the year. The increased burst of sea trout numbers in the 1970s is shown very clearly in Fig. 2. Comparison of Fig. 2 should be made with that part of the theoretical curve in Fig. 1 concerned with the 1970s.

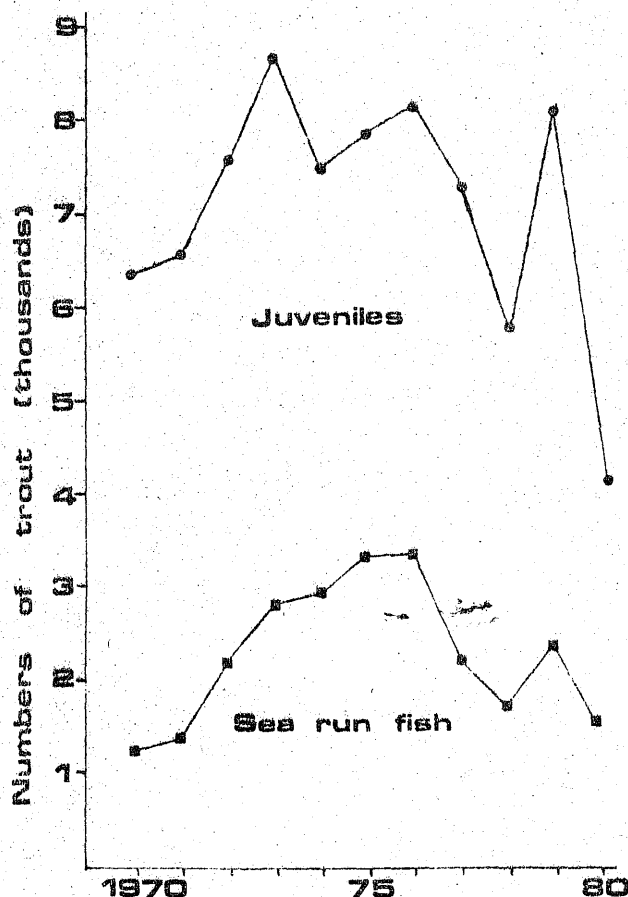


Fig. 2. Numbers of juvenile trout and sea run fish recorded in the Burrishoole Fishery from 1970 - 1980.

Specimen Trout

In 1955 the Irish Specimen Fish Committee began to monitor and give recognition to the capture of large specimens of various species of marine and freshwater fish. Sea, lake and river trout are treated as different categories of Salmo trutta. Up to 1962 the qualifying weight for specimen sea trout was 7lb but after 1962 it was amended to 6lb.

By some standards this weight is low. In Wales 15lb would be a more suitable weight for specimen status. 1980 was the year in which the largest number of specimen sea trout has so far been recorded, 12 being accorded specimen status this year. This record figure may be influenced partly by a recent increase in interest in reporting specimen fish at the Waterville fishery which form the majority of the specimens in 1970 and 1980. However, over the years there have been alternating periods when large and small numbers of specimen sea trout were recorded. The numbers since 1955 are shown in Figure 3. They form four clusters with peaks of distribution in 1960, '67, '74, and '80. Once more the occurrence of these peaks can be associated with clusters of favourable growing seasons some time in advance of them.

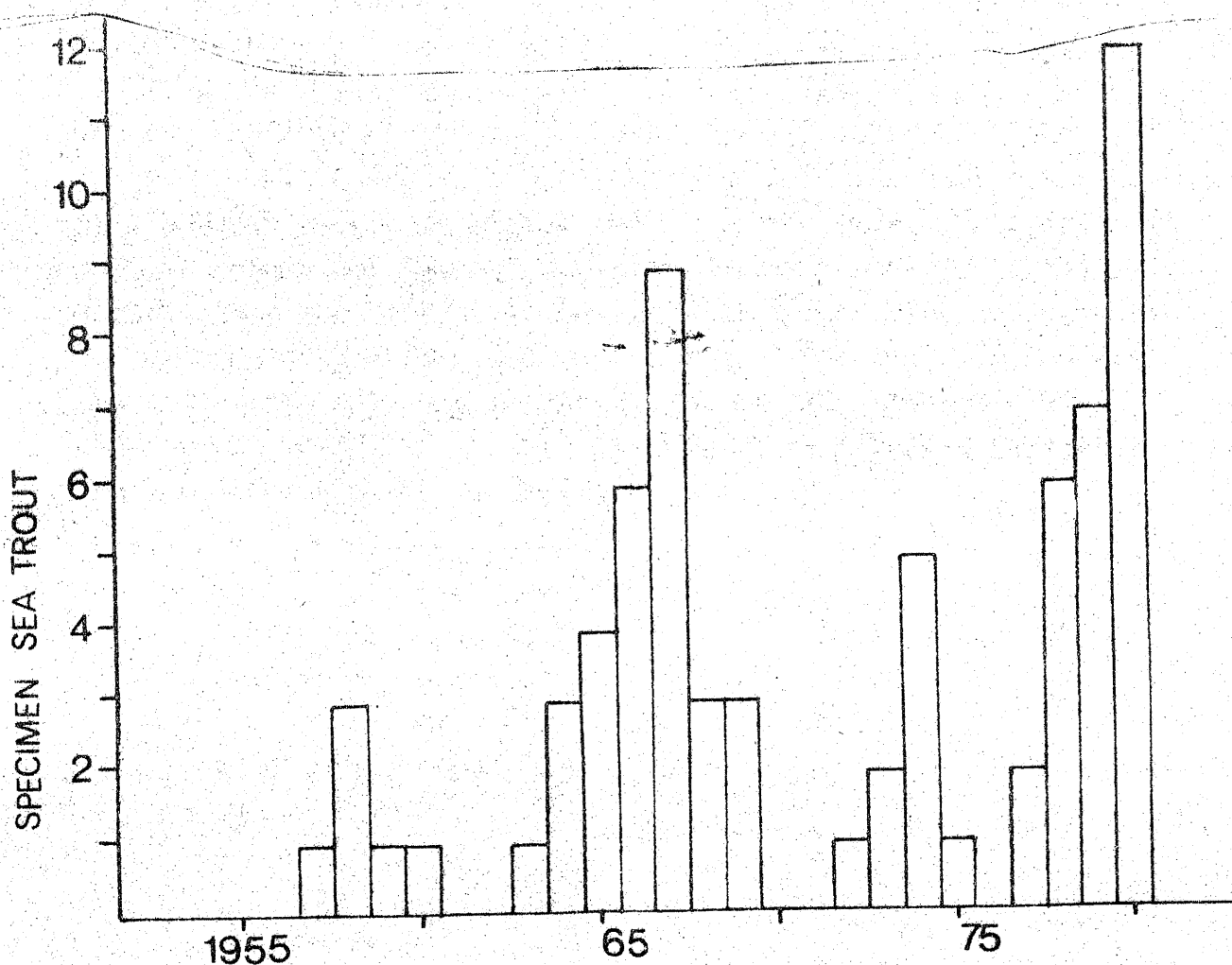


Fig. 3. Numbers of specimen sea trout recorded annually since the Irish Specimen Fish Committee came into operation in 1955.

Indeed statistical tests suggest that years with which we can associate the maximum numbers of fish migrating to sea for the first time are followed 5 to 8 years later by maximum numbers of specimen sea trout and examination of the scales of those sea trout shows that their average age is 7+ years. The calculated age of specimen sea trout, working on climatic data, is 7 to 10+ years.

Recorded Catch

The difficulty of trying to reach some conclusion about the success of the angler (and the netsman) has been referred to earlier and it must suffice in this case to give some indications of how that aspect of the catch, and a very sizable proportion of the total catch it accounts for, has lived up to previous years. Normally the Departmental statistics attempt to gather information from various sources to reach a conclusion about the weight and number of all sea trout captured in a particular district.

In this case however the numbers of sea trout have been gathered from one source: the fishery inspector in each Fishery District. In Table 1 have been set out numbers of sea trout captured in those districts whose inspectors responded to the request for information. In general the percentage change from 1979 to 1980 has been downwards although the extent of that change has not been terribly consistent everywhere and in one district there seems to have been a steep increase. The sea trout in Table 1 were caught by a number of methods and some general statements can be made about these. The vast majority of the east coast catch derives from commercial means, draft and small meshed drift nets. In the majority of west coast fisheries angling accounts for the largest proportion of the catch.

The data in Table 1 do not include partial returns from fishery districts. For example my colleague Miss E. Twomey reports that in 1980 238 sea trout were taken in the Cork drift net fishery; their average weight was 4.71b. In the early part of the 1980 season the Argideen, a small river in the Cork region had its best catches in 16 years; these to the end of June totalled 1200 sea trout. The Owenea, a small system in Co. Donegal, yielded 600 fish in the season. The district Inspector for the Dundalk region has no certain catch statistics for 1980 but reckons it was the best sea trout season for many years. He reports that one angler took 180 fish.

Table 1. Numbers of sea trout caught as returned by District Inspectors, for the years 1979 - 1980.

<u>District</u>	<u>1979</u>	<u>1980</u>	<u>% Change 1979/1980</u>
Dublin	4622	4467	-3.4
Wexford	1275	994	-22.0
Waterford	280	454	+62.1
Kerry	3203	2545	-20.5
Connemara	12256	10150	-17.2
Bangor	2300	2125	-7.6
Ballina	1323	No return	
Ballyshannon	No return	2306	
Drogheda	2400	6000	+150.0

Official angling returns

Salmon rod licences issued in 1980 totalled 17,776 (all categories) of which 1,019 or 5.7% had been returned by anglers bearing details of catch by 3 February, 1981. Information for which space is provided on the angling returns includes waters fished, period fished, number and weight of catch and there are separate columns for salmon and sea trout. A summary of this information is given in Table 2 in which the raw data provided by anglers are presented without further treatment. Should this exercise be repeated in future years trends in catch per angler should become obvious.

The ratio of days spent fishing for salmon and trout serves to identify the important sea trout angling areas, a high value indicating the main interest was sea trout and low values, salmon. The number of sea trout taken per day is evaluated on the basis of the number of days on which angling for this fish was specified only and not the total number of days in which fishing for salmon and sea trout took place. Yields of sea trout (per rod day) were highest in areas where these fish are traditionally the salmonid sought by the angler. The average weight of an individual sea trout caught in 1980 was higher than usually recorded in the districts concerned. Although the weights are only slightly greater than average (in Connemara for instance the usual average is 0.75lb) they do suggest that the stocks in 1980 contained a higher than average percentage of adult fish and previous spawners and this supports the belief that the spring run in 1980 was better than usual since the larger sea trout in a stock run into

fresh water earlier in the year. The high average weight in Kerry results from the Currane fishery at Waterville which dominates the returns for that region.

Table 2. Details of the sea trout rod catch in 1980, derived from licence returns.

Region	Ratio of sea trout fishing days to salmon fishing days	Number of sea trout per rod day	Average weight of individuals caught (lb)
Dublin	0.34	0.21	1.65
Wexford	0.50	0.96	0.74
Waterford	0.11	0.18	1.25
Lismore	0.18	1.11	1.10
Cork	0.53	0.68	0.97
Kerry	1.67	0.93	1.70
Limerick	0.40	1.01	0.74
Galway	0.77	2.73	0.99
Connemara	5.00	1.82	1.07
Ballinakill	1.67	2.42	0.97
Bangor	1.11	1.47	1.07
Ballina	0.29	0.43	1.14
Sligo	0.29	0.63	1.13
Ballyshannon	0.45	0.72	1.04
Letterkenny	0.83	1.32	0.83
Dundalk	3.33	0.67	1.16
Drogheda	1.43	0.69	1.24

Directions of Research

Problems to be tackled in order to enhance and improve the production and better the management of sea trout stocks.

Population assessments

Some two or three scale reading exercises of the traditional kind are carried out each year in an attempt to build up a data bank of information on various stocks. The Waterville stock was examined on a number of occasions by officers of, and others associated with, the Department since the 1920s. Our latest examination of the usual anglers' catch was carried out in the mid 1970s. Early in 1980 with the assistance of a bursary

student, Mr. Peter Gleeson of UCD, a collection of rod caught fishes was made and some 30 meristic characteristics of each fish were measured; it is hoped within a short time these will be stored on computer tape for comparison with other stocks. The biochemical makeup of the fish is also being examined and preliminary reports from Mr. Colin Fleming of QUB who has been examining the biochemistry of Waterville fish collected in the summer of 1980 are that this stock displays genetic variation and the fish are quite distinct from sea trout similarly examined from the Antrim coast.

In 1980 scales and life data were also collected from the sea trout of the River Feale in Co. Limerick and several small catchments in Co. Donegal.

In 1980 a more specific study of the spawning populations was undertaken and a large amount of material - scales and life data - from different parts of the Currane catchment is currently being examined.

Work has begun on the age structure of sea trout populations from the results of an automatic counter and we are hopeful of an outcome to this sometime in the coming year.

Mortality at Sea

Although we can now associate the runs of sea trout with certain climatic factors and we can therefore appreciate some of the environmental criteria which influence the production of sea trout there is a great deal more for us to learn if the quality of the sea trout run is to be improved artificially for those who wish to utilise the fish. For one thing we should try to discover the reason for mortality at sea. In some of our western fisheries as many as 90% of each year's migration perish. The reason for this we do not know, but obviously if their marine life could be prolonged to some extent the commercial value of those fisheries would be greatly improved. To date our work investigating this particular phenomenon has necessarily been a question of reviewing the literature, looking for specific differences in the performance of different fisheries which could be related to measurable characteristics of the stocks. But we are now planning to expand this work to the hatchery rearing of fish and the examination of their mortality under controlled conditions in salt water. We have also commenced, in association with Queens University, Belfast, examination of specific stocks which have long lived characteristics which might be transferred by selective breeding into other fisheries. Pre-eminent among these longer lived stocks are the sea trout of Lough Currane which for many years have been known to be longer surviving and thus of heavier weight at capture than any other west coast stock.

Fishery Yields

Another aspect of our work carried on fairly continuously is the effort to obtain a better understanding of the commercial and the angler's catch in different years and at different parts of the coast. Three such exercises are currently in progress. Twenty years catch data from the Newport River in Co. Mayo and data from Lough Eske are being critically investigated as is another sea trout fishery in Connemara. We urgently require catch statistics from any fishery in which sea trout feature among the catch - they need not however be the only quarry. Fisheries in which salmon are the principal prey of the angler - Lough Eske is a case in point - have a special interest of their own.

Fecundity analysis

The ovaries of a proportion of the Waterville fish examined in 1980 were taken for fecundity analysis. This could be an important line of enquiry because initial results suggest that the two main types of sea trout occurring in Ireland which have been previously classified as sea trout feeding in the Irish Sea and those which feed along the Atlantic coast (where the food supply is less plentiful) produce different numbers of eggs and Fig. 4 shows how such variation as has so far been measured is distributed among the two types of fish. It is in fact quite considerable. For example a fish of 40cm from the Irish Sea would be expected to produce 1,500 eggs while a fish of similar length which had fed in the Atlantic would produce 1,200. However, the comparison does not end there because some anglers suggest (and this is one of the few pieces of information to come from the angling fraternity so far) that the numbers of eggs in the body cavity of sea trout may vary considerably from one year to the next. It must be said that similar investigations on salmon do not reveal differences of this kind although differences in fecundity do emerge when stocks from different catchments are compared. Such differences in fecundity from one catchment to another may also apply to sea trout and that is a line of investigation to be considered also.

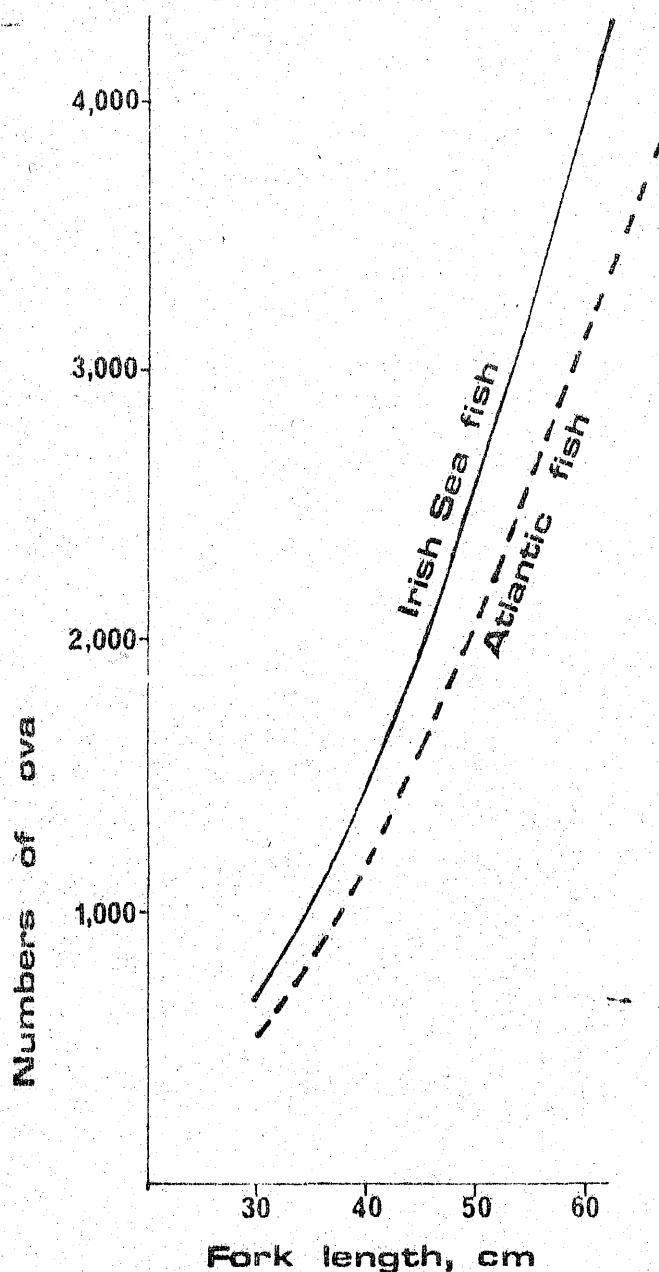


Figure 4

Numbers of ova from sea trout of different lengths feeding in the Irish Sea and the Atlantic

Two migrations

In addition to the discoveries on the genetics of sea trout from various parts of the coast it is also important to understand the significance of the two migrations which take place in sea trout fisheries each year and much of our effort in 1980 at FRC were directed to this particular problem; looking at the fine structure of smolt sea trout and autumn sea running brown trout and trying to interpret the results by the traditional scale examinations. In other words attempting to identify in which migration sea run fish originated.

Reports and Publications recently available

- (1978) Scale formation in sea trout smolts from two rivers with long estuaries. Boyle Fisheries Commission Annual Report Appendix III

This paper demonstrates considerable growth taking place in sea trout frequenting long estuaries during the spring of their first migration to sea.

- (1978) Why are some sea trout larger than others?
Proceedings I.F.M. annual study course, Derry

Reviews size range of Irish Sea trout and explanations previously given to account for it. Seeks reasons for predominantly low weight at capture.

- (1979) Performance of the Crumlin sea trout fishery, Co Galway
Fishery Leaflet No. 101 : 12 pp

Analyses the type of sea trout stock exploited and the yield of the fishery and gives a history of exploitation since the turn of the century.

- (1979) Sea trout from the tidal waters of the River Moy
Irish Fisheries Investigations A (18) : 11 pp

Examines catch by the Moy Fishery Company in two years in the mid 70s. The stock is a typical Atlantic feeding one, extremely short lived and this is the most important characteristic in its biology.

- (1980) Eubothrium crassum in migratory trout, Salmo trutta L. in the sea
J. Fish. Biol. 16 : 99-104

Eubothrium crassum is a tapeworm found in sea trout. The paper describes its pattern of infestation which varies with the age of the fish, decreasing in numbers as the age of the host increases. This is a result of the special feeding behaviour of different size groups of sea trout in the sea.

- (1980) Prey selection by young trout fry (Salmo trutta)
J. Zool. Lond. 190 : 27-37

Early feeding sea trout fry in artificial hatcheries in Connemara used to be fed on lake plankton. These investigations suggest that lake plankton occurring in the areas in which the hatcheries were situated might not be the most suitable starting food because the size of the constituent organisms is too small to be an attractive prey.

- (1980) "Growing season" as a factor in sea trout production
J. Fish. Biol. 17 : 541-546

Associates agricultural growing season with the output of juvenile trout from freshwater in various parts of Ireland and Britain. This paper is the basis of Fig. 1 in this report.