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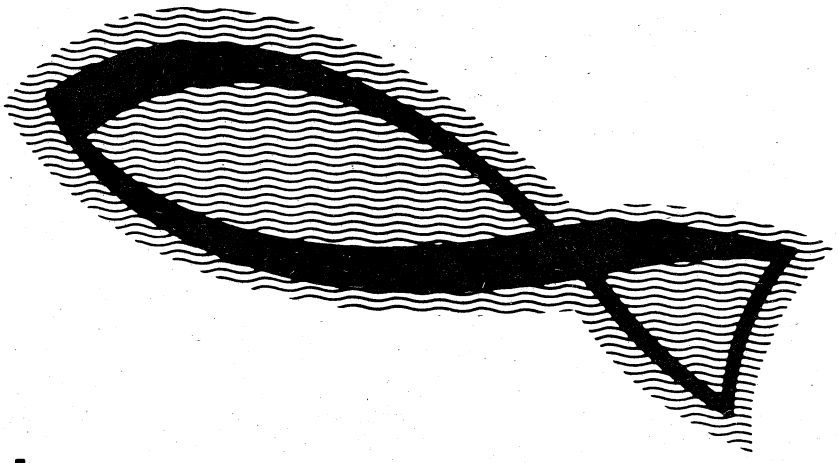
an roinn talmhaíochta agus iascaigh

Eel Research in 1974.



by

C. Moriarty.

DEPARTMENT OF AGRICULTURE AND FISHERIES
FISHERIES DIVISION
DUBLIN.1.

EEL RESEARCH IN 1974

1 Summary of the year's work

The value of eels at present is about 50p per pound, placing them amongst the most highly priced fish. Our studies over the past few years have shown that most of the Irish eel-bearing waters are seriously understocked. This situation can be greatly improved by artificial stocking.

Since eels must swim across the Atlantic to the Sargasso Sea before they spawn it is not possible to collect their eggs in the way used for salmon and trout. However, the juvenile eels or "elvers" which come in from the ocean and swim up our rivers can be caught and are easily transported overland. Under natural conditions it takes an eel ten years or so to move through a lake like Lough Derg or Lough Corrib, and so the waters upstream of these hold far fewer eels than they might.

The possibility of catching elvers and stocking them in public fisheries is now being investigated. One of the first problems is to find supplies and in 1974 the first of a series of exploratory tours took place. The elvers of some rivers such as the Maigue and Feale are already fished for and transported to the Shannon lakes. Elvers in rivers like the Corrib and Moy are needed to maintain the fisheries there and should not be removed. The search is therefore for rivers which attract quantities of elvers but where there are no fisheries for the larger eels.

The problem is a rather difficult one. Elvers may move in from the sea almost any time from February to July and as a rule they swim by night. However, in the daytime they rest under stones or burrow into river gravel. When a large run is in progress an elver may be found under almost every stone on the shore at low tide or dozens of them will wriggle out of a spadefull of gravel. So in April, May and early June elvers were searched for on the shore in rivers from the Shannon to the Swilly. Out of eighteen rivers (the details are given later in this leaflet) only one, the Erriff, looked really promising as a source for elvers. It was remarkable to find that on the same day that elvers were swarming in the

Erne there were hardly any to be seen on nearby rivers such as the Bundrowes and Drumcliffe. What the elvers seem to like best is a large river flowing into a narrow estuary.

Exploratory fishing with fyke nets for larger eels was continued with some very interesting results. In particular, the Lough Derg population was sampled again after a five-year interval. The number of eels had more than doubled and in Rossmore Bay we found the highest concentration of lake eels to date. This shows very clearly that the restocking in progress since 1960 is taking effect although the growth of Irish eels is so slow that no marked change in the catches of adult eels can be expected for a few years more. Good catches were also made in deep water (45 to 80 ft) where practically no eels had been found before. It seems that when the population was small there was plenty of room for the eels in the shallow water which they prefer. But as the numbers have increased more and more have moved to deeper parts. The deep water eels were well fed but ate different organisms from those in the shallows.

Two lakes, Loughs Cutra and Arrow, were explored at the request of the owners or of angling associations. Lough Cutra had a small population of slow-growing eels. The Lough Arrow eels were well fed but rather few and none at all were found in deep water.

Annual sampling in the Broadmeadow Estuary in Dublin and the South Sloblands Channel in Wexford showed that the steady increase in numbers following periods of heavy fishing had continued. An average catch of $2\frac{1}{2}$ lb per net was made in the Broadmeadow and this estuary could therefore be good for fishing in 1975 after a recovery period of four years.

A sampling programme of migrating or silver eels was begun in the Autumn by traps at Galway and Killaloe. Most of the Galway catch were of slow-growing males. At Killaloe the males were few and fast-growing while the females were mostly very old, 60% being over 20 years. This, together with information from the fyke net samples, shows that the eels of Lough Derg nearly all migrate upstream of the lake before

reaching maturity.

2 Elvers and small eels

Elver searches were made at the mouths of the following rivers; numbers present are given under the dates.

County	River	April 2-6	May 21-24	June 6-7
Clare	Fergus	0	0	
	Doonbeg		0	
	Inagh	2	0	
	Caher	0	3	
Galway	Ballinahinch	4	4	
Mayo	Erriff	abundant	abundant	
	Burrishoole		plentiful	
	Owenduff		2	
	Owenmore		0	
Sligo	Drumcliff	5		
Donegal	Bundrowes	20		
	Erne	abundant		plentiful
	Leannan	plentiful		2

The technique used was to turn over a minimum of fifty stones. If no elvers were seen the search was abandoned. If one or two were present a further fifty stones were examined in the hopes of finding greater numbers. However, when elvers were scarce under the first fifty stones they were always found to be equally scarce under the next fifty and even under a further hundred when the search was extended. On the other hand, where elvers were plentiful they could be found in numbers under the first two or three stones lifted, as many as ten or twenty often crowded into small spaces between stones.

A more extensive search over a longer period might have revealed substantial runs in some of the rivers where elvers appeared to be scarce or absent. However, the hunt is not simply for rivers where there are occasional runs of elvers but for rivers which have a sustained run suitable for the establishment of a fishery. So far, the Erriff seems to be the only really promising one but the Leannan has possibilities. It seems that the elvers are not strongly attracted to rivers which enter the sea on exposed coasts. They probably prefer sheltered estuaries in which they can rest while they wait for the water temperature to rise sufficiently high to allow entry into freshwater, which begins at about 9°C.

At Parteen Weir on the Shannon, where young eels are collected 9 miles upstream from the tide, monthly samples were taken. In 1973 the proportion of longer eels increased through the season but this increase was not apparent in 1974. Indeed the biggest were found in the May sample. As in 1973 it appeared that no elvers fresh from the sea travelled as far as Parteen.

Measurements of elvers on the coast, of young eels at Parteen and the age distribution of a sample of Parteen eels are given in Table 1. The smallest elver on the coast was caught in April on the Erriff and measured 54 mm, the smallest young eel at Parteen was 73 mm and had spent a winter in fresh water. Examination of the otoliths of 147 small Parteen eels supported the theory that no elvers reach the weir at Parteen in the course of their first summer. Small elvers were very scarce in the late May and June samples which suggests that a certain amount of growth takes place in the early summer. Age determinations of the Parteen eels showed an annual increase in length of about 3 cm.

3 Lake eels

Sampling of selected waters by standard trains of summer fyke nets was continued. Field assistance was given by Miss Mary Murphy, Miss Clare Goodman and Miss Helen Goulding, zoology students and by Mr B Doolin of Fisheries Division staff. Mr Hugh Weir very kindly helped with the netting in Lough Derg. Mrs Faith White provided full facilities for work at Lough Derravaragh. Some details of the

results are given in Tables 2 and 3.

Lough Derg was first sampled in 1969, nine years after the Electricity Supply Board had begun an annual stocking programme. At that time it was reckoned that none of the introduced eels would be big enough to appear in the fyke net catches. The average catch for ten nets in 1969 was 16 eels and only 12% of them were less than 40 cm. These figures indicated a poor stock of eels which were taking a long time to reach the lake. The 1974 sampling revealed a substantial change in the situation. The lowest average was 30 eels per ten nets and in one bay the average was 53 eels - the highest yet recorded in a lake in the State. Over 28% of these eels were smaller than 40 cm, showing that the numbers of younger eels were increasing.

Some samples were also taken in deep water, from 14 to 16 m down. Fishing at these depths in 1969 had yielded eight eels per ten nets. This time, however, a good catch was made and stomach examinations showed that the eels were feeding in deep water rather than resting there and coming into the shallows to forage. It seems likely that in 1969 when the total eel population was small there was sufficient space for most of the eels in the shallows. Now that pressure for space is higher, some of the eels have moved out into deep water. The most interesting point is that there is evidence of reasonably good feeding grounds in the deep parts of the lake.

Samples of silver eels were collected at Killaloe eel weir in the autumn. The majority were females measuring 46 cm or more and a varying proportion ranging from 9% in October to 17% in December were males, mostly less than 40 cm. The males were relatively fast-growing; four out of six were eight years old or less. The females were nearly all over 15 years and 63% were over 20. Yellow eels of more than 20 years were scarce in the Lough Derg samples in shallow water and it seems possible that most of the eels from this lake migrate upstream before reaching maturity. Fyke-net sampling in Lough Ree would clarify the situation and it is

hoped to experiment there in 1975. Sampling in Lough Derg will continue on an annual basis in the future. Eels numbering 233 were tagged to study growth and migration.

Lough Derravaragh had a very small population, yielding only eleven eels per ten nets. They were mostly large and rather old specimens but a few small young were present.

Lough Cutra also had a small population, ten eels per ten nets. Nearly half were between 40 and 50 cm, one quarter were larger and the remainder smaller. The very small numbers of small eels suggested that the river draining the lake, which flows underground for some distance, impeded the migration of elvers. It is also probable that the majority of Galway Bay elvers go to the River Corrib and not to Lough Cutra. In spite of lying in limestone surroundings, Lough Cutra is not a very rich lake, and growth rate of the eels was slow and maturity reached rather late. Twenty percent of the catch was over 15 years and the peak age was 13-14 years.

The stock in Lough Arrow was small, fourteen eels per ten nets. Intensive long-line fishing takes place in this lake and it seems that this is the principal reason for the poor population. Growth of eels in Lough Arrow is rapid and the feeding apparently very good. The value of the eel fishery could be enhanced if the line-fishing were to be restricted. A more detailed investigation will be necessary but it appears at present that the lake could yield considerable quantities of high-quality eels if long-lining were prohibited for some years and permitted only at long intervals thereafter.

4 Estuarine eels

Annual samples of eels have been taken in the Broadmeadow estuary since professional fyke-netting depleted the stocks in 1971. A steady recovery has been apparent and the estuary could again be profitably fished. The growth rate of these eels is one of the highest in the country: the annual increment is of the order of 5 cm as opposed to the usual figure of about 3 cm. High temperatures in the shallow

water and abundant food, mainly marine worms, would explain the fast growth.

A similar recovery has been shown by the Wexford South Sloblands eels but, three years after intensive fishing, the numbers are still less than half the initial population. In general it seems that a period of five years or more is required to allow an eel population to recover.

Table 1 Elver and young eel measurements 1974 (percentage of n) lengths to nearest whole number downwards.

Parteen elver trap

Length (cm)	6.9-7	8-9	10-14	15-19	20-24	25-32	n	mean	SE
Date									
21 May		11	32	29	22	6	148	15.9	0.43
24 June	1	44	40	8	6		491	11.3	0.19
26 July	1	46	41	7	3	2	302	10.7	0.20
27 August		15	68	11	6		71	12.1	0.41

June sample

Age (freshwater)	% (n = 147)	Length (mm) minimum	maximum	mean	SE
1	15	73	96	86.0	1.2
2	35	80	135	96.7	1.4
3	15	93	136	123.4	5.1
4	8	117	200	157.8	6.9
5	9	167	243	194.5	7.2
6	8	194	285	236.9	8.3
7	5	219	251	237.6	3.6
8	3	165	318	245.0	34.3
9	1			330	
10	1			245	

Elvers at coastal stations	Date	50-54	55-59	60-64	65-69	70-74	75 +	length (mm) n	mean	SE
Erne:										
Portnamarbh	April	5	14	44	37	5		56	63.6	0.45
Wrack Shore	April	5	11	44	26	6	13	74	63.5	0.44
Erriff	April	4 2	12	66	20			50	62.4	0.41
Erriff	May	23		45	52			31	64.6	0.44
Ardnacrusha		21	9	44	44	3		59	64.0	0.40
Burrishoole		24		47	47	6		34	65.0	0.42
Ballyshannon	June	6		53	38	9		32	64.7	0.51

Table 2 Catch, weight and length figures.

	Efforts (nets x days)	Numbers measured (n)	Per net Numbers	per day Weight g	per day Weight oz	Lengths (% of n) 30-39 12-15	40-49 16-19	50.85cm 20-36ins
Broadmeadow								
1972	24	29	1.2	203	7	39	34	27
1973	30	55	1.9	238	8	31	63	6
1974	24	168	7.1	1179	41	42	43	15
South Slob								
1970	48	408	15.6	2252	80	32	54	14
1972	54	15	0.3			40	53	7
1973	96	457	4.7	632	22	47	47	6
1974	24	157	6.4	924	32	39	54	7
Lough Derg								
1969	189	300	1.6	304	11	12	54	34
Whitegate	88	263	3.0	568	20	29	53	18
Rossmore	64	337	5.3	1148	40	28	49	23
Deep	32	107	3.3	771	27	20	53	27
L. Derravaragh	32	35	1.1			12	20	68
Lough Cutra	120	124	1.0	192	7	29	45	26
Lough Arrow	120	177	1.4	361	13	19	38	43
Killaloe								
October		92				9	10	81
December		151				17	10	73

Table 3 Age distribution and calculated growth rates.

	Calculated length at 10 years	Calculated length at 15 years (cm)	Percentages of sample in length groups 4-8	9-10	11-12	13-14	15-20	21-26	27-32
Broadmeadow	45	52	59	33	8				
Lough Derg									
Whitegate	35	44	2	5	20	26	42	5	
Rossmore	39	48	3	10	40	29	16	2	
Deep	36	43		1	15	12	44	25	3
Killaloe									
females					6	3	31	51	
males			67	33					
L. Derravaragh	45	61	6	4	37	24	29		
L. Cutra	41	48		26	19	35	17	3	
L. Arrow	42	59		24	38	19	13	2	4