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Development of Irish Eel Stocks

by

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Studies on changing populations of eels are in progress in a number of Irish waters. Results to date on two of these are of interest in the extent to which they have confirmed predictions made on the basis of age determinations using burned otoliths. Age determination of eels of less than eight years old can be made with a considerable degree of confidence but older specimens are frequently confusing. In some populations only about 25% of a sample of otoliths present clear rings, all of which can be considered as annual marks.

The two populations treated in this report are those of Lough Derg, first sampled in 1969 and the South Sloblands Channel, first sampled in 1970. Lough Derg, 11,714 hectares, is one of the largest Irish lakes and lies 20 km from tidal boundary of the River Shannon. In 1928 a hydro-electric dam was built downstream of Lough Derg and it appears that this seriously disrupted the ascent of elvers. Fishing for yellow eels is prohibited on this lake by the fishery owners, the Electricity Supply Board, and there is reason to believe that clandestine fishing is very limited in extent. Lough Derg may therefore be considered to hold an unexploited stock of eels. In 1960 the Board began to capture elvers downstream of the dam and transport them overland to Lough Derg and other upstream lakes.

In the summer of 1969 a sample of yellow eels was taken in fyke nets of cod end mesh 12 mm (stretched). A full description of the results has been published (Moriarty 1974). Catch figures are given in Table 1 and length and age determinations in Tables 2 and 3. The mesh size used prevented the capture of many eels of less than nine years old and therefore the majority of specimens sampled represented the stock which had arrived in the lake without the aid of overland transport.

The catch per unit of effort (catch per net per twentyfour hours in nets set overnight) was low at 1.6 eels. The inference made on the basis of the 1969 study was that the sampling gave a fair indication of the nature of the population uninfluenced by elver transport. If the transport were effective in increasing the stock this would become apparent in the sampling in several years' time.

The next sample was taken in 1974 and revealed a great increase in the population. The catch per unit of effort was 3.0 in nets set at random in water of less than 4 metres deep, nearly double the figure for 1969 and including a considerable increase in the numbers of small eels. The proportion of eels of less than 12 years in the samples had dropped, from 63% to 28%. The number of these younger eels per unit of effort, however, had not changed so dramatically, falling from 1.0 to 0.84, a figure of uncertain significance in view of the lack of precision of age determinations and the small size of the 1974 sample.

A remarkable development in Lough Derg was the extent to which deeper water became populated by the eels. In 1969 the catch per unit decreased with increasing depth, from 1.6 in the shallows to 0.8 in water of 30 metres. In 1974 nets set from 14 to 16 metres down caught 3.3 eels, a figure slightly above the mean of the shallows and in 1975 nets at 30 metres caught 4.9. These eels were somewhat bigger and older than those from the shallow water. It appears that the increasing numbers in the shallows forced the population to search for food in deeper water.

There is no obstruction to eels leaving Lough Derg and proceeding upstream to other lakes on the river system. It is hoped that continued sampling will indicate when a maximum density of yellow eels for Lough Derg results in a constant population size.

The South Sloblands Channel is a much smaller body of water, 100 hectares with a depth of between 0.5 and 3 metres. It contains drainage water from an area of reclaimed land and has a salinity of the order of 2^o/oo resulting from seepage of sea water. There is no upstream outlet for eels and this may explain the fact that the density of population is the highest recorded in Ireland. In 1970 the catch per unit effort in the fyke nets was 15.6. The Channel is very rich in nutrients and reaches a high summer temperature. Eels grow relatively fast and a high proportion of otoliths can be read with confidence.

Eels of larger sizes and high ages are scarce and, since there can be no upstream migration, it appears that maturity is reached at relatively low ages and small sizes. Since capture of the silver eels had not been satisfactory the owners of the fishery were advised to fish for yellow eels using fyke nets. On the basis of the 1970 sample it was suggested that one season's netting would virtually exhaust the stocks and fishing should be suspended until annual sampling indicated recovery to the 1970 level. It was estimated that this would take five years.

Accordingly the channel was fished intensively in 1971 and in 1972 the catch per unit effort was 0.3. In the succeeding years the anticipated increase took place until in 1975 a catch of 13.3 eels per net indicated that recovery was almost complete. The owners have been advised to fish again in 1976.

Reference

Moriarty, C. (1974). Studies of the eel Anguilla anguilla in Ireland.

3. In the Shannon Catchment. Ir. Fish Invest. Ser. A. 14.

Table 1. Catch per unit of effort.

Place	Date	Effort (nets X days)	Catch	Catch per unit effort
Lough Derg	1959	77	123	1.6
	1974	88	263	3.0
South Sloblands	1970	48	408	15.6
	1972	54	15	0.3
	1973	96	457	4.7
	1974	24	157	6.4
	1975	32	427	13.3

Table 2. Length distributions (cm. to nearest whole number downwards, percentage of n)

Derg	25-34	35-39	40-44	45-49	50-59	60-69	70-91	<u>n</u>
1969	1	11	27	27	29	4	1	271
1974	6	23	27	26	14	2	2	240
South Sloblands								
1970	6	25	31	23	10	4	1	408
1974	3	36	40	14	5	1	1	157

Table 3. Age distribution (years, percentage of n)

Derg	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-23	<u>n</u>
1969	1	8	22	32	22	10	4	1	259
1974		2	6	20	26	21	14	11	55
South Sloblands									
1970	10	30	22	20	9	5	2	2	91
1974	(No sample)								