

Herring Investigations in Donegal Bay (1962 and 1963)

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Farran (1946) has shown that the success of the Donegal Bay herring fishery in the period 1921 to 1941 depended on the visits of Scottish steam and motor drifters which landed their catches at Killybegs. These boats fished along the North Mayo coast and off Donegal Bay and Rathlin O'Birne Island for spring spawning herrings which in May and June were coming into condition after spawning. Visiting boats also took part in a September fishing for autumn spawning fish close inshore. The catches on the west coast of Donegal from 1921 to 1941 were only exceeded by those from North Donegal, Howth, Waterford and the Cork coast. The average yield per year was 4,000 crans.

To-day the main fishing season starts in mid-October and ends in January or February. The catch is composed of approximately 60% spents during the season. The landings for the past three seasons have been as follows:- 1960/61, 6,607 crans; 1961/62, 20,047 crans; and 1962/63, 14,870 crans. Sporadic landings of herrings are made during the May/October period each year, and it is on these samples that the 1962 programme was carried out. As the quantities landed prior to October 5 were small and the main herring season did not commence until October 11 the results may not be fully representative of the stocks. At least two races were identified, the majority (58%) being autumn spawners while the remainder (42%) were a mixture of winter and spring spawners. No attempt was made to separate the winter and spring spawning types. The monthly age distribution of the autumn and winter/spring types is shown in Table 1.

The dominant year-classes in the autumn spawning group were the 5- and 4-year olds, while the 8- and 6-year olds were also well represented. Similar dominant year-classes were found in the winter/spring group but the 3- and 7-year olds were also prominent.

As all the fish examined were trawl caught herrings and lacked scales it was not possible to calculate the growth after one year (L<sub>1</sub> distribution). The age distribution and racial type of these herrings were determined by an examination of the otoliths and confirmed by other meristic characters such as the numbers of vertebrae and the maturity of the gonads. The mean length, mean vertebral count per racial type per age class per maturity stage is summarised in Table 2. All stages of maturity were found. Monthly totals per year class per maturity stage (details not given in this paper) show that the autumn spawners were mainly recovering spents (Stage VIII) and maturing virgins (Stages II and III) in early May. During June and July these fish were filling (Stages IV and V). In August and September the autumn spawners were in advanced Stage V with some running (Stage VI). By mid-October the major portion of these fish were spents (Stage VII). The winter/spring component showed a much slower rate of development and were mainly fulls (Stage V) in October.

The major portion of the landings from Donegal Bay took place after these preliminary investigations had ended in October, 1962. Each season the main landings are made only after the autumn spawning has been completed. All attempts to locate the autumn spawners, as Stage IV and V's in previous seasons have failed and only sporadic landings have been made before October. In May, catches were recorded over a scattered area from 3 miles south-east to 8 miles north-west of Rathlin O'Birne. Several catches were made 11 miles east-north-east of the Stags of Broadhaven in June in 45 fathoms. In July and August several landings were made from deep water 20-25 miles off Rathlin O'Birne. The following month, catches were again made off the Stags.

Spring Spawning Adults in Donegal Bay. A sample of large herrings, in an advanced stage of maturity (Stage VI), taken north of the Stags of Broadhaven on the 22nd March, 1963 was also examined. The length groups recorded covered a wide range from 28.5 to 39.5 cm with a peak at 36.0 cm. The age distribution is shown in Table 3.



Table 1

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Age distribution per month

AUTUMN COMPONENT

No. of Winter rings	2	3	4	5	6	7	8	9	10	11	12
May	8	23	14	1	-	2	-	-	-	-	-
June	1	21	41	15	3	9	1	1	-	1	-
July	12	43	167	50	36	61	41	36	7	5	2
August	14	73	134	31	9	24	16	10	3	1	-
Sept.	5	12	5	-	1	1	-	-	-	-	-
October	35	142	223	71	77	91	49	32	18	2	1
TOTALS	75	314	584	168	126	188	107	79	28	9	3

WINTER COMPONENT

No. of Winter rings	1	2	3	4	5	6	7	8	9	10	11	12
May	-	13	40	75	23	42	46	31	30	31	7	1
June	-	-	13	59	17	11	12	12	6	4	-	1
July	-	10	61	56	10	19	33	10	12	20	2	-
August	-	2	32	54	13	-	-	1	1	-	-	-
Sept.	-	33	29	10	1	-	1	1	-	-	-	-
October	1	50	54	50	21	25	21	23	11	8	-	-
TOTALS	1	108	229	304	85	97	113	78	60	63	9	2

Table 2

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Mean Length, Mean Vertebral Count per Maturity Stage per Age Class per racial type

AUTUMN COMPONENT

No. of Winter rings	2	3	4	5	6	7	8	9	10	11	12
Maturity I-III	26 25.89 56.54	37 26.27 56.40	17 27.43 56.29	2 28.3 56.50	- - -	- - -	- - -	- - -	- - -	- - -	- - -
III	8 25.75 56.25	32 27.55 56.47	70 28.76 56.40	26 29.64 56.08	19 30.66 56.26	26 31.09 56.15	12 31.12 56.08	10 31.12 56.10	5 31.16 56.20	4 31.55 56.50	- - -
IV	14 26.61 56.36	55 27.95 56.38	170 28.86 56.49	47 29.76 56.40	23 30.65 56.52	45 30.98 56.49	25 31.1 56.36	26 31.45 56.42	1 31.50 56.00	2 31.50 56.00	2 31.75 57.00
V	10 26.23 56.40	45 28.01 56.58	104 28.74 56.51	22 29.62 56.23	7 30.40 56.14	26 30.88 56.58	21 31.12 56.24	11 31.68 56.36	4 32.12 56.75	1 29.7 56.00	- - -
VI	2 27.15 57.00	34 27.77 56.53	45 29.03 56.62	11 29.81 56.64	30 31.13 56.50	32 31.19 56.78	6 31.35 57.00	5 31.50 56.40	2 32.15 56.00	- - -	- - -
VII	14 26.22 56.57	91 27.90 56.54	153 28.89 56.46	48 29.72 56.31	38 30.73 56.47	44 31.13 56.43	39 31.49 56.36	24 31.43 56.33	12 31.57 56.50	2 31.85 56.50	1 33.5 57.00
VIII	1 27.5 57.00	20 27.67 56.5	25 28.60 56.44	12 29.74 56.58	9 30.75 56.78	15 31.05 56.67	4 31.05 56.75	3 31.40 56.67	4 31.60 56.00	- - -	- - -
TOTALS	75	314	584	168	126	188	107	79	28	9	3

WINTER COMPONENT

No. of Winter rings	2	3	4	5	6	7	8	9	10	11	12
Maturity I-III	51 25.26 56.74	45 24.99 56.67	33 27.17 56.85	1 27.20 56.00	- - -	- - -	- - -	- - -	- - -	- - -	- - -
III	9 26.05 56.55	44 27.57 56.79	76 28.43 56.87	14 30.01 56.57	20 30.40 56.75	30 31.02 56.83	13 31.06 56.77	11 31.48 56.91	7 31.54 56.86	2 32.35 57.00	- - -
IV	20 25.9 56.40	62 27.69 56.72	42 28.83 56.86	14 29.96 56.93	- - -	1 32.4 57.00	1 31.60 57.00	1 30.90 57.00	13 31.68 56.77	- - -	- - -
V	27 26.04 56.74	70 28.00 56.63	56 29.04 56.71	21 30.28 56.62	25 31.20 56.44	21 31.07 56.38	24 31.80 56.58	11 31.77 56.64	8 31.54 56.25	- - -	- - -
VII	- - -	1 27.8 57.00	7 28.48 56.57	1 29.90 56.00	7 30.73 56.86	5 30.54 56.40	8 31.75 56.37	5 30.92 56.60	7 31.21 56.71	- - -	- - -
VIII	1 26.10 57.00	7 27.58 56.55	90 28.74 56.79	34 29.43 56.56	45 30.35 56.75	56 30.90 56.61	32 31.10 56.72	32 30.96 56.72	28 31.15 56.39	7 31.34 56.57	2 32.55 57.50
TOTALS	108	229	304	85	97	113	78	60	63	9	2

(One 1-winter ring fish omitted 23.0 cm and 57 Vert(s))

Table 3

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Age distribution

No. of winter rings	4	5	6	7	8	9	10	11	12	13	14	15	Total
Nos. of fish	5	4	6	9	10	18	31	21	10	3	4	1	122

Table 4

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Numbers of fish, mean length, mean vertebral count per maturity stage per year class

No. of winter rings	4	5	6	7	8	9	10	11	12	13	14	15
Maturity V	1 35.00 57.00	- - -	- - -	1 34.60 57.00	- - -	- - -	3 36.30 57.00	1 35.00 56.00	- - -	- - -	- - -	- - -
VI	4 29.70 56.75	4 34.30 57.25	6 33.43 57.17	7 33.27 57.00	8 35.69 56.62	18 36.52 57.22	27 36.32 56.92	20 36.93 56.95	10 37.26 56.90	3 37.37 57.67	4 38.05 57.00	1 38.6 57.00
VII	- - -	- - -	- - -	1 31.20 58.00	2 31.80 57.00	- - -	1 34.50 57.00	- - -	- - -	- - -	- - -	- - -
TOTAL	5	4	6	9	10	18	31	21	10	3	4	1

Table 5

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Age distribution of immature herrings

No. of winter rings	0	1	2	3	No reading	Total
Nos. of fish	3	619	21	1	56	700

Table 6

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Age distribution of immature herrings

No. of winter rings	0	1	2	Total
Nos. of fish	1	318	18	337