

**N. North Sea
Lemon Sole, Herring**

1947 and 951 fish in 1948. This represents a decrease of 35.6 % and is borne out by trawl skippers who, throughout 1948 have found the species scarcer than at any time since the end of the war.

B. B. Rae.

Herring.

Continued Observations on the Herring Concentration on the Fladen Ground, the Gut, and Environment, 1948.

1. Fishing Grounds and Landings.

As in the preceding years the herring concentrations in the northern area of the North Sea were again actively trawled by Belgian fishermen. The grounds worked by them during the period July to October are situated between 55° to 58°30' N. Lat. and between 0°30'W. and 2°E. Long. (see the accompanying chart). 62 trawlers were attached to this fishery. The average duration of a voyage is calculated to 11.5 days, or 8 days effective fishing.

2. Biological Statistics.

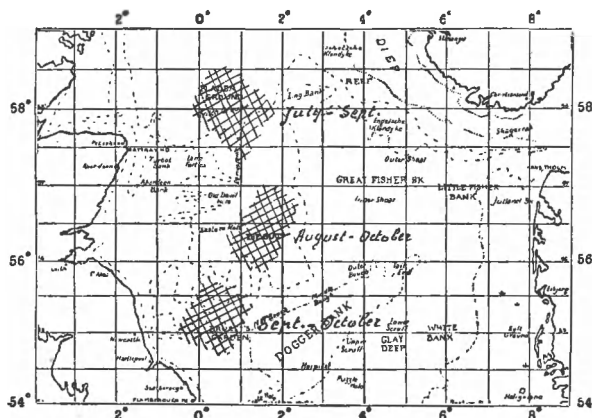
The material has been collected during the period August to October. It includes 18 series of 50 herrings each, i.e. a total of 1,000 herrings, 400 for August, 400 for September and 200 for October.

As in 1946 and 1947, the results have been divided in monthly periods, so as to observe the variations which might occur in the composition of the herring concentrations.

The various biological characters of each stage of maturity have again been examined, i.e., the total number of vertebrae, the number of prehaemal vertebrae, and the number of keeled scales. The results confirm once more the presence of two well-

Monthly Landings of Herring.

	Number of landings	Weight landed Total (tons)	Weight landed for one landing (tons)	Average catch for one fishing day per 1 developed H.P.(kg)
July	22	403	18	5
August	79	2,259	33	9
September	101	6,074	60	17
October	52	3,040	58	15
Total	254	12,104	48	13



Fishing grounds exploited by Belgian herring trawlers during July—October 1948.

defined groups: one group including herring in maturity stage I to IV, the spawning of which will probably not take place before the beginning of 1949, and a second group including the herring of maturity stages V to VIII-II, i.e., herrings in full reproduction or very near maturity.

Size Distribution (Measurement to the millimeter).

Period	cm.	22	23	24	25	26	27	28	29	30	31	Mean	Weight. g. Mean
August	0.5	—	0.5	6.2	16.8	40.8	28.2	6.8	0.2	—	—	27.5	165
September	0.2	—	0.2	4.0	18.2	37.5	30.5	8.8	—	0.5	—	27.6	159
October	3.0	8.5	7.0	19.0	25.0	28.5	7.5	1.5	—	—	—	26.2	134
Total	0.9	1.7	1.7	7.9	19.0	37.0	25.0	6.5	0.1	0.2	—	27.3	157

Sex

Maturity Stages (Percentage Distribution).

Period	Male %	I	II	III	IV	V	VI	VII	VIII-II
August	53.7	0.5	4.8	10.8	23.5	49.2	5.0	3.0	3.2
September	51.5	1.2	2.5	14.0	12.2	24.5	33.2	3.5	8.7
October	52.0	—	1.5	1.0	2.0	28.0	39.5	5.5	22.5
Total	52.5	0.7	3.2	10.1	14.7	35.1	23.2	3.7	9.3

Mesenteric Fat. (Percentage distribution according to periods and according to groups).

Period	0	1	+	M	Group	0	1	+	M
August	23.5	35.5	23.0	18.0	1st (maturity stage I-IV)	1.4	10.1	39.4	49.1
September	31.2	34.0	15.0	19.8					
October	32.5	57.5	7.0	3.0	2nd (maturity st. V-VIII-II)	39.3	51.3	7.4	2.0
Total	28.4	39.3	16.6	15.7					

Age (Percentage distribution).

Age (years)	3	4	5	6	7	8	9	10	11	Number of fish with readable scales
Year-Classes in 1948	1945	1944	1943	1942	1941	1940	1939	1938	before 1938	
August	0.6	12.7	9.1	21.2	14.5	20.6	11.5	2.4	7.3	165
September	—	20.5	12.3	17.8	13.7	9.6	9.6	5.5	11.0	73
October	6.0	24.0	6.0	6.0	20.0	14.0	4.0	10.0	10.0	50
Total										
1948	1.4	16.7	9.4	17.7	15.3	16.7	9.7	4.5	8.7	288
1947	5.3	8.7	17.2	13.7	18.7	11.9	10.9	4.4	9.1	
1946	4.4	9.5	11.5	23.9	14.3	10.7	11.3	7.4	4.8	

Vertebrae.

a) Total number of vertebrae.

Period	Percentage distribution according to periods.														Mean
	54	55	56	57	58	59	Mean	21	22	23	24	25	26	27	
Aug.	0.5	2.0	45.5	42.2	9.5	0.2	56.590	0.2	4.0	28.5	42.8	19.8	4.2	0.5	23.92
Sept.	0.5	4.2	37.0	52.0	6.0	0.2	56.595	—	2.8	24.8	51.5	16.0	4.2	0.8	23.97
Oct.	—	7.0	35.0	53.0	4.5	0.5	56.565	—	2.5	26.0	48.5	20.5	2.0	0.5	23.95
Total	0.4	3.9	40.0	48.3	7.1	0.3	56.587	0.1	3.2	26.5	47.4	18.4	3.8	0.6	23.95

b) Prehaemal vertebrae.

Groups	Percentage distribution according to groups.														Mean
	54	55	56	57	58	59	Mean	21	22	23	24	25	26	27	
1st	—	3.1	27.5	54.4	15.0	—	56.812	—	1.7	18.5	48.4	25.1	5.6	0.7	24.16
2nd	0.6	4.2	45.2	45.9	3.9	0.4	56.496	0.1	3.8	29.7	47.0	15.7	3.1	0.6	23.86

Keeled Scales (K2).

Periods	Percentage distribution according to periods.								Mean
	12	13	14	15	16	17	18	Mean	
Aug.	0.5	11.0	42.5	38.0	7.0	0.8	0.2	14.43	
Sep.	0.8	17.0	40.5	31.5	9.0	1.0	0.2	14.35	
Oct.	—	7.0	38.5	38.0	14.0	2.0	0.5	14.67	
Total	0.5	12.6	40.9	35.4	9.2	1.1	0.3	14.45	
Group	Percentage distribution according to groups.								Mean
	12	13	14	15	16	17	18	Mean	
1st	1.0	23.0	44.3	27.9	3.8	—	—	14.104	
2nd	0.3	8.4	39.6	38.4	11.4	1.5	0.4	14.585	

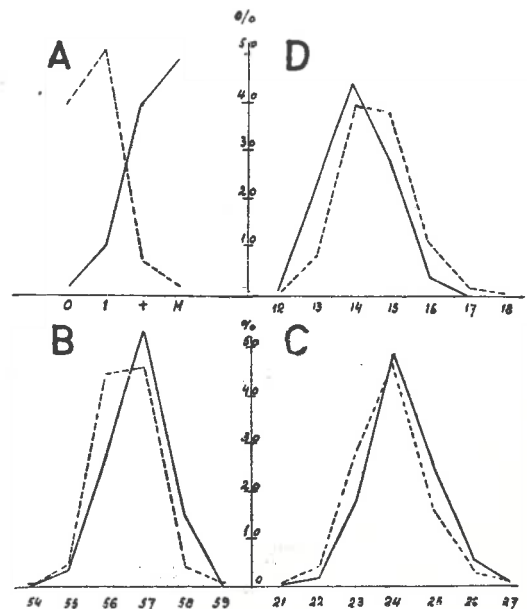


Fig. 14.

- A. Quantity of fat content.
- B. Number of vertebrae.
- C. Number of prehaemal vertebrae.
- D. Number of keeled scales.

— 1st group (Mat. stage I to IV).
 - - - - 2nd group (Mat. stage V to VIII-II).

Fig. 14.

3. Some Considerations.

If we judge from the biological characters of each maturity stage we find again that the herring concentrations, fished by the Belgian trawlers on the Fladen and the Gut, consist of populations of different origin — at least during the period July to September — one in some way or other related to spring spawners, the other resembling the autumn spawners of the North Sea type.

The subdivision of our observations into monthly periods gave also good results. The biological composition of the concentrations proved to remain practically uniform during the months July to September, while from October it was subjected to heavy changes, i.e., an appreciable decrease in the mean size and weight, an increase in the well-advanced maturity stages and the appearance of the spent stage, a decrease in the mesenteric fat, in the vertebral mean, and in the mean of the prehaemal vertebrae, and an increase in the number of keeled scales.

All these changes indicate clearly a sudden deficiency of spring spawners, beginning with the month of October, in other words they suggest that the southerly limits of this population should be situated between 55° and 56° N. Lat.

Monthly Distribution of the two Herring Populations.

Months	Latitudes North	Percentage distribution	
		Spring-spawners	Autumn-spawners
August	58°30' — 56°	39.5	60.5
September	58° — 56°	30.0	70.0
October	57° — 55°15'	4.5	95.5
Total	58°30' — 55°15'	28.7	71.3

The Dutch Herring Fisheries in 1948.

Drift-Net Fisheries.

As a continuation of the paper on this subject in the Vol. IV of this series we are presenting here the charts of the Dutch herring season 1948 (charts 1—16).

The charts are composed in the same way as in the previous paper. We got data of about 110 vessels, covering about 50% of the fishing activity of the whole lugger fleet. Most of the vessels were fishing with 60 nets in May, with 80 in June, and with 100 or 110 nets in the other months, the nets being set either for surface or for deeper water fishing.

This year we got some information about the quality of the herring caught on the different grounds (matjes, full, spawning, spent). The charts No. 17—24 refer to this specification.

Stomach Contents.

Period	Percentage distribution.		
	full	half full	empty
Aug.	1.0	9.5	89.0
Sep.	—	10.5	89.5
Oct.	23.0	39.5	37.5
Total	5.0	15.9	79.1

Nature of contents	
Aug.	schizopods, copepods
Sep.	schizopods, copepods, herring eggs
Oct.	copepods

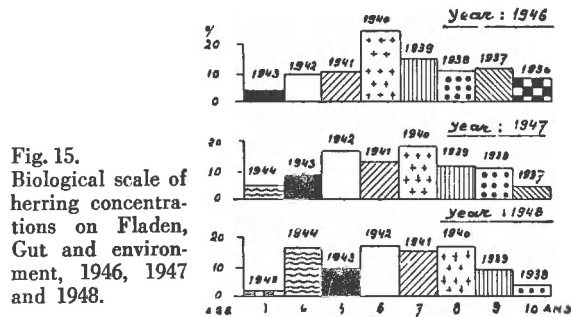


Fig. 15. Biological scale of herring concentrations on Fladen, Gut and environment, 1946, 1947 and 1948.

The frequency of the year-classes proves the presence of 5 good recruiting classes, i.e., 1944, 1942, 1941, 1940, and 1939. The 1945 class, 3-year-old herring, which appears for the first time in the concentration, is very poorly represented and constitutes thus a very bad recruiting class.

Ch. Gilis.

The distribution of the fleet in 1948 shows a difference from 1947, especially in the month of August. As the market preferred small herrings, and at that time the catches in the more northern part of the North Sea consisted of larger herrings, the fleet was fishing more to the south.

As the charts show, the mean catch per shot on the different grounds differs largely in some months when compared with the same grounds in the same months of 1947. Especially in the first months of the 1948 season, the catches were poor; in some other months the catches were better than in the previous year.

Table 9 gives the total quantity of drift-net herring landed. The total amount landed, calculated in kg., is 97,681,500 kg.

J. de Veen.