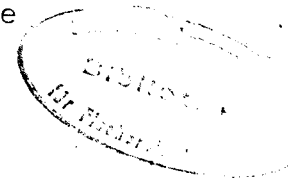


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Abundance of Baltic herring larvae in the seas around Finland
in 1974

by

V. Sjöblom and R. Parmanne

Finnish Game and Fisheries Research Institute, Fisheries Division
P.O. Box 260, SF-00531 Helsinki, Finland

Introduction

The first experiment to sample Baltic herring larvae in Finland by the method adopted in this report was made in 1972, when the modified Gulf V sampler was used from a small boat in the islands. In 1973 sampling in various parts of the coast was not started until the end of July and the beginning of August. At that time, however, very few larvae were caught, on account of which the material could not be used for the evaluation of the abundance of the larvae. In 1974 regular sampling was started at the end of May - beginning of June at six permanent field stations and continued to the end of the season. This yielded the first complete series of samples according to which the following information on the abundance of Baltic herring larvae in the seas around Finland is given.

Material and methods

Sampling was made off six field stations located in the Archipelago Sea (ICES subarea 29), on the coast of the Bothnian Sea (30), the Bothnian Bay (31) and the Gulf of Finland (32) (Fig. 1). The samples were taken with the modified Gulf V sampler (NELLEN & HEMPEL 1969) equipped with a "baby hai" for plankton sampling (cf. SCHNACK 1974). The sampling was performed from small (7 - 11 metre) fishing boats. At each station weekly hauls at five or six sites were made. The depth of the water was 8 - 20 metres. The gear was lowered and lifted by hand with a rope with marks corresponding to the given depths of equipment at a speed of 4 knots (cf. SJÖBLOM & PARMANNE 1975). The gear was let down to the water so that its opening was just below the surface at the towing speed. Then the rope was run slowly to reach the mark on the rope corresponding to a depth of one metre in 1 minute and 15 seconds. The run of the rope was continued to the mark at a depth of two metres and then to a depth of three metres etc. The time between the different marks on the rope was always 1 minute and 15 seconds. After the desired depth was reached, about two metres above the bottom the boat was stopped and the gear was raised to the surface as rapidly as possible. The duration of the sweep varied according to the depth of the water from 7.5 to 22.5 minutes. The towing speed was determined with the VDO pressure log.

The method was chosen to obtain representative samples in order to estimate the number of larvae in the whole water column. The results are given as the mean monthly number of larvae per unit of surface area (cf. TANAKA 1973). Species other than Baltic herring larvae were also caught. These and the plankton samples are not included in the report.

Results

The abundance of Baltic herring larvae is given in Table 1. The highest abundance, mean for May - August, 44 larvae below 10 sq. m of sea surface, was caught in the Archipelago Sea, subarea 29 (Kustavi). The next most abundant amount, 21 larvae, was caught in the central part of the Bothnian Sea, subarea 30 (Reposaari). The abundance of larvae in the Gulf of Finland, subarea 32, was 6 in the western part (Inkoo) and 4 larvae in the central part (Valko) below 10 sq. m of sea surface. Least of all, 1 larva below 10 sq. m of sea surface, was caught in the Bothnian Bay, subarea 31 (Kalajoki).

The highest abundance per one sample, 306 larvae below 10 sq. m of sea surface, was caught in the Bothnian Sea, subarea 30 (June 5, sampling depth 6 metres). The highest abundance per one sample in the Archipelago Sea, subarea 29 (June 27, depth 10 metres), was 283 larvae below 10 sq. m of sea surface. In the Gulf of Finland, subarea 32, the highest abundance was 29 larvae (June 26, depth 18 metres) and in the Bothnian Bay, subarea 31, 11 larvae below 10 sq. m of sea surface (July 29, depth 6 metres).

The highest monthly mean was in the Archipelago Sea, subarea 29, in May (80 larvae below 10 sq. m of sea surface), in the Bothnian Sea, subarea 30, in June (45 larvae) and in the Bothnian Bay, subarea 31, in August (2 larvae). In the Gulf of Finland there was no sampling done in May 1974. The highest monthly mean in the Gulf of Finland, subarea 32, was in June (9 larvae below 10 sq. m of sea surface).

Discussion

The observations made so far show that abundance of Baltic herring larvae on the Finnish coast is low compared with the findings from elsewhere in the Baltic (LINDBLOM 1973, SCHNACK 1974). Very high densities compared with our larval abundance were observed for Atlantic herring (e.g. HYRONIMUS 1971, HEMPEL & SCHNACK 1971, SAVILLE 1970, BOËTIUS & MC KAY 1974 a, 1974 b).

When looking into the big differences in the larval abundance between Baltic and Atlantic herring, one must notice that the Baltic herring larvae are caught in very shallow water compared with the sampling depths in the North Sea and the Atlantic. Baltic herring spawns on the Finnish coast mostly in a depth less than 10 metres (cf. SJÖBLOM 1961). In the open sea area of the Baltic very few larvae are caught (LINDBLOM 1973).

In addition, the highest larval densities of Atlantic herring are often in relatively restricted areas. Spawning Baltic herring are caught, and spawning thus takes place along the whole Finnish coast. It therefore seems that the larval production of Baltic herring on the Finnish coast might be larger than could be concluded just from the small larval numbers in the samples.

Summary

Sampling of Baltic herring larvae was carried out with a modified Gulf V sampler, towed in an oblique haul at a speed of 4 knots. In six localities in ICES subareas 29 - 32 a total of 34 stations were visited weekly from May - June to August. A water column of 6 - 18 metres was sampled, sampling being performed down to about 2 metres above the bottom. The highest abundance, mean for May - August, 44 larvae below 10 sq. m of sea surface, was caught in the Archipelago Sea, subarea 29. The highest abundance per one sample was 306 larvae below 10 sq. m of sea surface. The highest monthly means were in the Archipelago Sea (29) in May, in the Bothnian Sea (30) in June and in the Bothnian Bay (31) in August.

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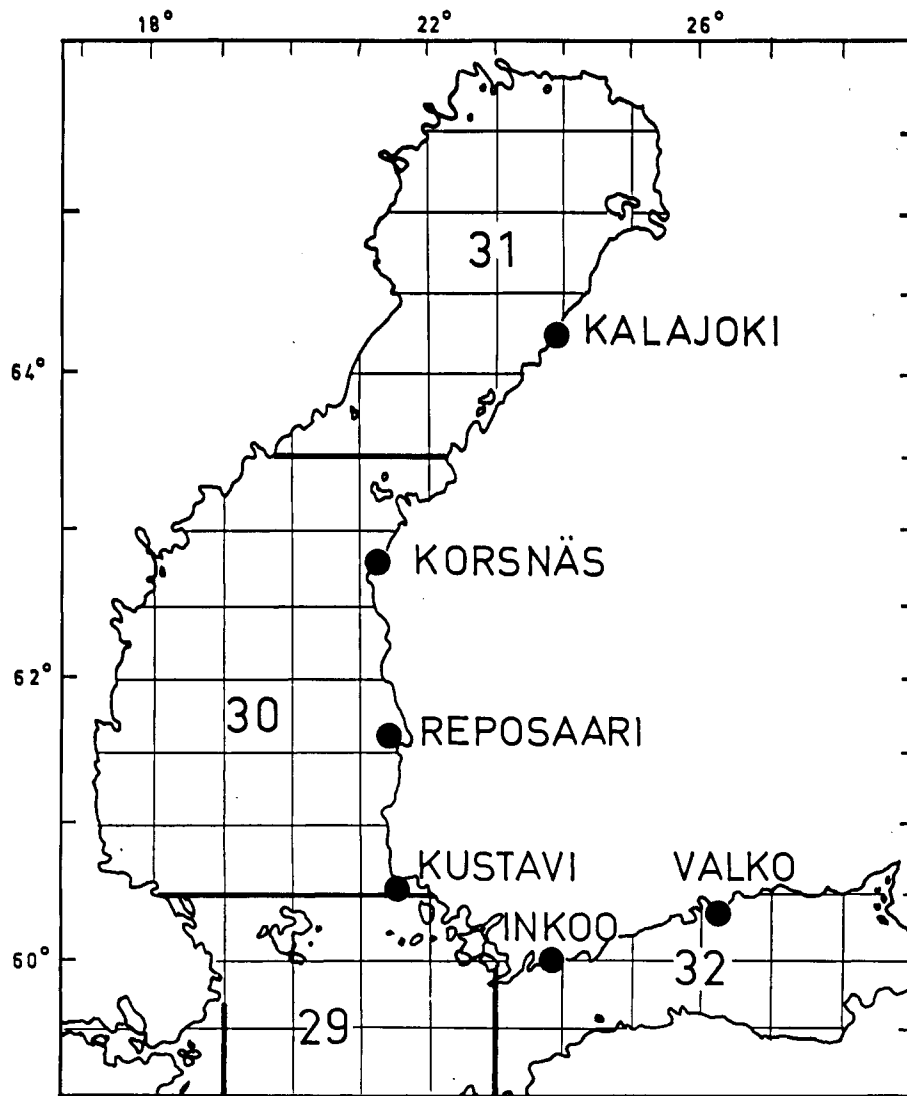


Fig. 1.
Permanent field stations for sampling Baltic herring off the Finnish coast in ICES subdivisions 29 - 32.

Table 1. The abundance of Baltic herring larvae <10 mm, 10 - 15 mm and >15 mm at various sampling sites off the field stations shown in Fig. 1. Monthly mean numbers below 10 sq. m of sea surface.

Field station	Sampling depth, m	May			June			July			August			May - August		
		<10	10-15	>15	<10	10-15	>15	<10	10-15	>15	<10	10-15	>15	<10	10-15	>15
Kustavi (29)																
1	10	54	91	0	126	17	2	5	17	6	0	0	0	46	31	2
2	10	73	53	0	39	18	1	5	8	5	0	0	0	29	20	2
3	18	15	3	0	7	4	0	18	27	9	0	0	3	10	9	3
4	13	39	55	0	66	24	0	8	14	0	0	0	1	28	23	<1
5	8	43	31	0	29	5	2	7	13	3	0	0	0	20	12	1
6	18	9	12	0	4	2	1	21	25	2	0	0	0	9	10	1
1 - 6		39	41	0	45	12	1	11	17	5	0	0	1	24	18	2
Reposaari (30)																
1	8	0	0	0	14	4	0	30	6	0	0	0	0	11	3	0
2	7	3	0	0	47	3	0	11	1	0	0	0	0	15	1	0
3	15	0	0	0	13	3	0	15	4	0	0	0	0	7	2	0
4	5	3	0	0	36	9	0	10	5	1	0	0	0	12	4	<1
5	8	48	0	0	52	4	0	30	7	1	0	7	0	33	5	<1
6	6	17	0	0	85	2	0	10	1	1	3	3	0	29	2	<1
1 - 6		12	0	0	41	4	0	18	4	1	1	2	0	18	3	<1
Korsnäs (30)																
1	8				1	0	0	18	1	1	0	0	0	6	<1	<1
2	7				1	0	0	3	1	0	0	0	0	1	<1	0
3	7				1	0	0	2	0	0	0	0	0	1	0	0
4	5				1	1	0	1	0	0	0	0	0	1	<1	0
5	8				1	0	0	1	1	0	0	0	0	1	<1	0
6	8				2	1	0	1	1	0	0	0	0	1	1	0
1 - 6		-	-	-	1	<1	0	4	1	<1	0	0	0	2	<1	<1
Kalajoki (31)																
1	6				0	0	0	2	2	0	0	0	0	1	1	0
2	14				0	0	0	1	0	0	0	3	0	<1	1	0
3	6				0	0	0	0	0	0	4	0	0	1	0	0
4	6				0	0	0	0	0	0	0	0	0	0	0	0
5	9				0	0	0	0	0	0	0	0	0	0	0	0
1 - 5		-	-	-	0	0	0	1	<1	0	1	1	0	<1	<1	0
Inkoo (32)																
1	10				12	6	0	2	3	1	0	0	3	5	3	1
2	12				10	1	<1	3	1	1	0	0	0	4	<1	<1
3	9				4	2	0	7	1	1	0	0	0	3	1	<1
4	8				3	0	0	7	1	1	0	0	0	3	<1	<1
5	10				4	2	0	2	1	0	0	0	0	2	1	0
1 - 5		-	-	-	7	2	<1	4	1	1	0	0	1	4	1	1
Valko (32)																
1	5				5	1	0	1	0	1	1	0	0	2	<1	<1
2	7				6	1	0	2	0	0	0	0	0	2	<1	0
3	18				7	5	1	2	2	1	0	0	0	2	2	<1
4	7				3	2	0	3	0	0	0	0	0	3	2	1
5	9				5	1	0	1	0	0	0	0	0	2	<1	0
6	12				6	4	2	3	1	0	0	0	0	3	2	1
1 - 6		-	-	-	5	2	1	2	1	<1	<1	0	0	2	1	<1