

Increase in the Stock Number of Autumn Herring
in the Baltic

by

J. Popiel & K. Strzyewska

The Baltic herring stock number undergoes considerable oscillations. It is characteristic that, on the whole, the numeric increase of the stock of autumn herring is accompanied by the decrease in the spring stock and vice versa. I.I. Nikolaiev (1957) links these oscillations with the periodical changes in the environmental factors.

In 1945 when our Institute started investigations on the state of the Baltic herring stock, a very characteristic composition of generations was observed in the catches of the autumn herring.

Almost all catches in 1945 of this herring were composed of old fish hatched in the autumn of 1937. This year-class dominated, in spite of its age, in the autumn herring stock up to 1952 whereas the yield of catches decreased rapidly. This was a typical example of the disappearing of a fish stock as a result of a non-replenishment of the stock by juvenile fish. In the period from 1945 to 1950 the phenomenon of the disappearing of the autumn stock was of the same character both in the Gulf of Gdansk and the Bornholm Basin.

The increase in number of the autumn stock started earlier in the Bornholm Basin, where the quite numerous year-class hatched in the autumn of 1948 appeared in 1950. This year-class was also slightly more numerous than others in the Gulf of Gdansk too, but not enough to be reflected in the yield of catches.

During a few years following 1948, the autumn generations of herring were rather poor, and an increase in the number of this stock was not noted until 1953.

We know too, that there was simultaneously a rapid decrease in the number of the coastal spring herring stock.

The increase in number of the autumn herring was checked owing to the heavy winter of 1956. This state lasted, however, only a short time and in the following years a successive appearance of more and more numerous generations were observed. The relations described above are well illustrated in the Table 1 elaborated on the material concerning the replenishing of the Baltic herring stock (J. Elwertowski, J. Popiel, 1961). This Table has been supplemented with data for the current year.

It is evident from Table 1 that the process of increase in number of the stock was considerably oscillated in the last 2 years. The generations hatched in the autumn of 1959 and 1960 were particularly numerous. They were more or less the same in the Gulf of Gdansk, while in the Bornholm Basin the 1960 year-class was more numerous than the 1959 year-class. It should be stressed that the figures inserted in this Table illustrating the number of year-class are comparable only in the range of the discussed region. They should not serve to compare the number of herring stock in both regions. This is due to the different character of the fishing grounds and the fishing gear applied in the Gulf of Gdansk and Bornholm Basin.

The considerable inflow of the juvenile herring observed last year was reflected in this year's catches.

In the period from the end of April to the end of June or the beginning of July the autumn herring usually concentrate on the opensea fishing grounds for feeding. The herring are then very often caught by the fishermen. Quite contrary to the feeding concentrations of the summer-autumn period, the spring herring constitutes the minority in the catches.

In May this year the concentrations of the autumn herring were especially numerous, much more so than last year. The Table 2 illustrates this.

A great majority of the landings, about 85%, was composed of herring, the mean length of which was 15 to 22 cm, the fish 18-20 cm in length being most numerous represented. The age of the fish in both areas investigated is presented in Table 3.

It may be observed from Table 3 that the age composition in the regions being compared was quite similar in spite of the distinct differences. The most distinct difference was noted in the participation of the 1959 generation in the catches on the R,S - 7,8 fishing ground and a larger number of the 1956 generation on the W,X - 11,12 fishing ground. It should be stressed that only one sample was taken from the latter fishing ground. At any rate, the 1959 year group was numerously represented on both fishing grounds.

It is apparent from the comparison of Tables 2 and 3 that in general outline the same generations appear numerously both in the catches of juvenile fish and in the older age-group stock. The autumn 1956 generation is the only exception; it appeared in a very small number in the catches of the 1 year age group in the Gulf of Gdansk, while there was a mass appearance of the 5 year age group, especially on the W,X - 11,12 fishing ground. Perhaps this is due to a migration from other regions outside the Gulf of Gdansk.

It results from the above, that the increase in number of the autumn 1 year-old age group herring observed in 1961 has been very distinctly reflected in the productivity of catches. It is to be expected that the appearance of the 1960 year-class in the 1963 catches will be similarly advantageous.

Table 1

Catches of 1 year-old age group Spring and Autumn Herring
in kg and Individuals per 1 cutter/day

GULF OF GDANSK

Years	kg/cd	Weight % of		Spring herring			Autumn herring		
		Spring herring	Autumn herring	year-class	kg/cd	ind/cd	year-class	kg/cd	ind/cd
1952	180,0	-	-	1952	180,0	18.950	-	-	-
1953	142,8	63,7	36,3	1953	91,0	6,740	1952	51,8	3,198
1954	75,9	71,3	29,7	1954	54,0	4.320	1953	21,9	1.288
1955	65,3	26,8	63,2	1955	17,5	1.882	1954	47,8	2.880
1956	2,0	77,5	22,5	1956	1,6	222	1955	0,4	26
1957	12,5	30,3	69,7	1957	3,8	339	1956	8,7	561
1958	42,0	16,4	83,6	1958	6,9	500	1957	35,1	2.279
1959	37,6	25,7	74,3	1959	9,7	746	1958	27,9	1.516
1960	98,8	9,0	91,0	1960	8,9	651	1959	89,9	5.731
1961	70,3	6,7	93,3	1961	4,7	376	1960	65,6	5,046

BORNHOLM BASIN

Years	kg/cd	Weight % of		Spring herring			Autumn herring		
		Spring herring	Autumn herring	year-class	kg/cd	ind/cd	year-class	kg/cd	ind/cd
1953	28,1	27	73	1953	7,5	384	1952	20,6	888
1954	14,3	8	92	1954	1,1	55	1953	13,2	518
1955	92,6	15	85	1955	13,7	1.105	1954	78,9	4.509
1956	-	-	-	-	-	-	-	-	-
1957	1,0	10	90	1957	0,1	10	1956	0,9	40
1958	30,7	7	93	1958	2,3	144	1957	28,4	1.264
1959	40,5	23	77	1959	9,3	690	1958	31,2	1.510
1960	57,7	1	99	1960	0,5	48	1959	57,2	2.542
1961	103,0	2	98	1961	2,0	144	1960	101,0	5.844

Table 2

Productivity of catches in May

Fishing ground	Y e a r	
	1961	1962
W, X - 11, 12	215 kg per 1 cutter/day	1045 kg per 1 cutter/day
R, S - 7, 8	83 kg per 1 cutter/day	153 kg per 1 cutter/day

Table 3

Age of herring in May 1962 catches

Fishing ground	R, S - 7, 8													Total
Year-class	1960 1961	1959 1960	1958 1959	1957 1958	1956 1957	1955 1956	1954 1955	1953 1954	1952 1953	1951 1952	1950 1951			
Age	1	2	3	4	5	6	7	8	9	10	11	12+		
Autumn herring	14	302	62	123	112	16	45	15	12	1	18	10	820	
Spring herring	1	11	117	21	17	6	2	0	0	4	0	1	180	
Total	15	403	179	144	129	22	47	15	12	5	18	11	1000	
Fishing ground	W, X - 11, 12													
Autumn herring	4	190	59	79	310	20	46	13	1	1	1	3	727	
Spring herring	0	9	151	0	49	1	39	10	8	5	0	1	273	
Total	4	199	210	79	359	21	85	23	9	6	1	4	1000	