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Assessment of the mackerel stock in the Northwest Atlantic, 1975-1977

by

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In 1975, the conditions for the mackerel fishery were favourable. The USSR annual quota of catch appeared to be taken already by 15 March in Subarea 5 and Statistical Area 6. Catches per effort were at the level of 1975. In 1976, the USSR catches were based on the 1973 and 1974 year-classes (Table 1), the last ones dominated in 1975 catches as well. These two year-classes are abundant enough. Thus, the analysis of the catch age-composition for 1966-1973 (Table 2) showed that the most abundant 1967 year-class gave 408.9 million specimens at the age of three years or 45.1% of the total annual catch, and the 1973 year-class gave 702.7 million specimens or 50.1% respectively.

In order to assess the 1973 and 1974 year-classes we used the factors of the catch per effort as well (Table 3). The 3-year-olds of 1967 and 1973 year-classes made 10,757 and 9,405 specimens respectively in catches of RTMA type vessels per hour trawling. Two-year-olds of the abundant 1969 and 1974 year-classes consisted of 2,932 and 5,642 specimens respectively.

These data were used while assessing the 1973 and 1974 year-classes. These year-classes were found to be rich and made 75 and 50% respectively from the level of the 1967 year-class. While assessing the stock condition, it was assumed that the 1976 age composition of catches for all countries corresponded to that of the USSR catches. The calculated value for 1977 stock made 1.3 million tons (Table 4). It should be noted that the abundance of 1973 and 1974 year-classes was under-estimated by Anderson (Res.Doc. 76/VI/29, Working Paper No. 76/IV/87), and the depletion rate was overestimated in those year-classes depending on the commercial mortality (F).

Thus, for example, as for 1976 the 1973 year-class was assessed as 196.1 million specimens, and this year-class was estimated as 199.7 million specimens in the 1976 USSR catches exclusively (Table 1), whereas it appeared to be as high as 702.7 million specimens in the catch taken by all countries.

Table 1. Age composition of the USSR catches in 1976[1] (Subarea 5+Statistical Area 6).

| Month | \ Age | | | | | | | | | | Catch | |
	1	2	3	4	5	6	7	8	9	+10	million specimens	tons
January	0.3	44.4	63.9	12.5	9.4	5.0	5.0	2.3	1.2	0.2	144.2	30.000
February	1.6	51.2	98.1	13.4	7.0	2.9	2.3	1.1	0.7	+	178.3	41.720
March	0.5	23.4	37.7	6.2	3.6	1.9	1.6	0.7	0.5	+	76.1	16.280
January-March, %	2.4 / 0.6	119.0 / 29.9	199.7 / 50.1	32.1 / 8.1	20.0 / 5.0	9.8 / 2.5	8.9 / 2.2	4.1 / 1.0	2.4 / 0.6	0.2 / +	398.6	88.000
Catches of all countries[2]	8.4	419.4	702.7	113.6	70.1	35.0	30.9	14.0	8.4	0.2	1402.3	310.000

1 Preliminary data.
2 One can assume that the age composition of the other countries corresponds to the age composition of the USSR catches.

Table 2.   Size of different year-classes aged 3 in the commercial
           catches (%).

	Year-classes							
	1966	1967	1968	1969	1970	1971	1972	1973
Million specimens	99.9	408.9	110.7	287.7	237.1	267.7	109.7	702.7
%	20.1	45.2	7.9	22.8	16.7	23.8	9.0	50.1

Table 3. Catch of mackerel per hour hauling from onboard RTMA type vessels (pelagic hauling), Subarea 5+Statistical Area 6.

Years	Age										Catch in spec.	Catch in tons	% of mackerel in catch
	1	2	3	4	5	6	7	8	9	+10			
1970	3.845	1.111	10.157	5.312	.667	.289	.200	.333	.245	67	22.226	5.69	88.0
1971	.313	2.932	1.790	10.764	5.237	.806	.269	.134	67	67	22.379	6.49	87.8
1972	91	1.529	5.296	3.130	6.351	1.310	.200	73	.182	37	18.199	5.66	72.9
1973	.448	2.631	4.736	4.483	4.073	2.670	.370	78	I	+	19.490	5.73	68.0
1974	.296	2.739	6.140	1.954	2.006	2.006	1.936	.314	52	+	17.443	5.32	75.1
1975	5.461	7.230	1.327	1.004	.425	.306	.476	.612	.170	I	17.012	4.27	86.2
1976	.112	5.642	9.405	1.505	.940	.470	.432	.188	.113	+	18.807	4.10	69.1

Table 4. Results of mackerel assessment for Subarea 3 to Statistical Area 6.

Age Group	Mean weight (kg)	Part. recr.	Age composition of stock and catch (millions)		
			1975	1976	1977
Stock					
I	0.095		3700.0[1]	2500.0[2]	2500.0[2]
2	0.175		3047.0	2498.0	1675.0
3	0.266		774.0	1740.0	1353.9
4	0.350		358.6	359.1	751.7
5	0.432	Partial recrument as in ICNAF Summ. Doc. 75/18 p.32	106.2	157.8	153.3
6	0.506		120.5	46.7	67.4
7	0.564		119.2	53.0	19.4
8	0.615		119.3	52.4	22.6
9	0.659		26.7	52.5	22.4
10+	0.693		11.7	16.9	33.9
Number (10^6)			8383.2	7476.4	6599.6
Weight (000 t)			1489.3	1463.4	1317.2
Catch					
0			2.1	-	
I			332.5	8.4	
2			470.8	419.4	
3			109.7	702.7	
4			86.4	113.6	
5			53.8	70.1	
6			57.1	35.0	
7			48.4	30.9	
8			41.8	14.0	
9			10.6	8.4	
10+			5.0	0.2	
Number (10^6)			1218.2	1402.3	
Weight (000 t)			283.4	310.0	
Fishing mortality ages 4+			0.52	0.55	

1; Assumed egual to 50% of the 1967 year-class at age 1.
2; Assumed egual to the average strength of the 1967-72 year-classe:
3. Total number and weight are for 1+fish