

Northwest Atlantic



Fisheries Organization

Serial No. N1823

NAFO SCS Doc. 90/24

SCIENTIFIC COUNCIL MEETING - SEPTEMBER 1990

Polish Research Report, 1989

by

A. J. Paciorek

Sea Fisheries Institute
Gdynia, Poland

Introduction

The total catch by Polish fishing vessels in NAFO Subareas 2 to 6 in 1989 amounted to 9,329 metric tons compared to 11,880 metric tons in 1988 (Table 1). The decrease has resulted mainly from a reduction of mackerel catches in SA 5+6 by about 2100 metric tons and to a lesser extent those of Greenland halibut in Div. 2GH (by about 400 metric tons) and other by-catch species in SA 5+6. The only significant decline in the quota allocation was that of mackerel in SA 5+6, from 10,950 metric tons in 1988 to 9,000 metric tons in 1989 (Table 2).

The level of the catch quota utilization was high in case of witch flounder in Div. 2J+3KL (90.33%), mackerel in SA 5+6 (84.42%) and Greenland halibut in Div. 2J+3KL (72.00%), (Table 2). No directed redfish fishery in Div. 2+3K, roundnose grenadier fishery in SA 2+3 and squid *Illex* sp. fishery in SA 3+4 were conducted. No fishing operations were carried out in Div. 2GH due to absence of information on any significant concentrations of cod and Greenland halibut there. It was not found profitable to deploy a separate vessel in the capelin fishery taking into account its unstable character and the different timing of the fishing season.

In general, 82.0% of the overall catch by Polish fishing vessels consisted of mackerel, followed by witch flounder (7.4%), Greenland halibut (3.9%) and Atlantic herring (3.1%). The share of other species totalled 3.6% (Table 1).

Subarea 2

Status of Fisheries and Research

No Polish fishing vessel was involved in any fishing, scouting or research activity in this area in 1989. The total catch in 1988 of 474 metric tons was taken in Div. 2H. The bulk of it (414 metric tons) consisted of Greenland halibut and was accompanied by small quantities of American plaice (25 metric tons), redfish (19 metric tons), and even lower amounts of other demersal species.

Subarea 3

Status of Fisheries and Research

The total catch by the only Polish fishing vessel m.t. "Andromeda" (B-15 type) operating only in Div. 3K in 1989 was 1160 metric tons compared to 1366 metric tons in 1988 (Table 3). The fishery was conducted during January - March period. In January the main species sought was Greenland halibut (287 metric tons), while in February and March it was witch flounder amounting to 214 and 459 metric tons respectively. The most abundant species taken as the by-catch was American plaice constituting from 9.4% in January to 6.3% in March. The proportion of roundnose grenadier and redfish in the by-catch was rather insignificant (0.6 - 0.7% in January and March, 6.8% in February).

No biological samples from Subarea 3 fishery were collected.

Subarea 4

Status of Fisheries and Research

Based on a bilateral agreement with Canada a short cruise (12 days fished) devoted to exploratory mackerel fishing within Divisions 4X and 4W was conducted by m.t. "Kulbin" (B-29 type) between May 6 - 17. In Division 4X only 1 ton of mackerel was caught (Table 4). In spite of the fact that the main species sought was mackerel, the major part of the total catch in Division 4W (235 metric tons) constituted herring (151 metric tons). Other by-catch species were spiny dogfish (26 metric tons) and haddock (4 metric tons).

The biological samples were collected from mackerel and herring catches. Fork length of 1775 mackerel specimens from Division 4W was measured. Mackerel length ranged from 26 to 41 cm. Bulk of fish was confined to 27 - 29 cm length classes (Table 5). The most abundant were mackerel from 1987 year-class (75.5%), followed by 1986 year-class (11.7%) and 1984 year-class (6.2%) (Table 6). The prevailing gonads maturity stages of mackerel caught in Division 4W were 1 - 3 (immature - resting - developing) in almost equal proportions (22.1 - 26.0%) (Table 7). Gonads of 70.8% of mackerel specimens from Division 4X were at maturity stage 5 (mature) while 20.2% were at stage 6 (spawning). Most of mackerel stomachs originating from both Division 4W and 4X were filled up to 50% of their volume (35.1 and 44.2% respectively) (Table 8). The share of empty stomachs was rather low ranging from 18.9 to 2.0% respectively. The proportion of stomachs fully filled with food (stomachs' fullness degree 3 and 4) was relatively high ranging from 19.0% in Division 4W to 38.7% in Division 4X.

The total number of herring specimens taken for length measurements from Division 4W was 1167. Their fork length ranged from 20 to 37 cm with bulk of fish confined to 30 - 35 cm length classes. The most abundant (44.7%) was age-group 5 (1984 year-class) followed by age-group 6 (35.5%, 1983 year-class). (Table 11). The prevailing part of the herring sampled had gonads in resting stage (56.3%) and in developing stage (40.3%). (Table 12). The feeding intensity as indicated by the stomach fullness degrees was almost evenly distributed amongst the five classes, each comprising above 20% of fish, except of the 4-th degree to which 14% of stomachs was allocated (Table 13).

Subarea 5 and Statistical Area 6

The total catch of all species caught by the Polish fishing fleet in Subarea 5 and Statistical Area 6 amounted to 7895 tons. Most of the catch (76.8%) originated from Division 6A. The catch from Subdivision 5Zw contributed only 3.1% of the total (Table 9). Mackerel constituted 96.2% of the total Polish catch taken in these areas. The most abundant species in the by-catch was herring (1.7%) which was present in all three Divisions fished. Herring was followed by porgies (1.1%), spiny dogfish (0.3%) and alewife (0.2%). The share of other species was very low (below 0.1% in each case).

The only vessel type involved in the mackerel fishery was B-29 (tonnage-class 6). The distribution of mackerel catches by month and Division is shown in Table 10. Almost 77% of the total mackerel catch was taken in Division 6A. From Division 6B originated 19.4%, from 5Zw only 2.9% and from Division 4W - 0.7%. More than 30% of the total was caught in April. In January and February the share taken amounted to about 24% in each case, while in March was close to 20%. The proportion caught in May was slightly above 1%.

Biological sampling of mackerel catches, like that in Subarea 4, comprised length measurements, collecting of otoliths and determination of gonad's maturity and stomachs fullness. For length measurements 30,672 mackerel specimens were collected (Table 5). The fork length of the mackerel in samples ranged from 19 to 46 cm. The most abundant were length-classes from 35 to 38 cm. The age composition was dominated by 5 years-old specimens from 1984 /year-class. The proportion of this age group was the highest (67.3%) in Division 5Zw in April, followed by 42.2% in Division 6B in February and 40.9% in Division 6A in March. In other Divisions and month its share ranged from 17.4 to 32.4%. The next abundant year-class was 1983 (age group 6) whose share in catches fluctuated from 14 to 37.2% except of Subdivision 5Zw in April where it amounted to only 6%.

The majority of mackerel gonads (74.6%) in Division 6A in January was in stage 2 (resting). (Table 7). In the same Division in February the stage 3 (developing) was prevailing (40.5%), while in Division 6B in February the bulk of mackerel gonads (65.1%) was in stage 4 (developed). A very similar gonad's maturity distribution was found one month later in Division 6A. In April in Division 6A the majority of gonads (59.4%) were in stage 5 (spawning). In the same month in Division 5Zw at the same stage even a higher proportion of spawning fish was present (72.9%) and at the same time a substantial part (16%) were already spent (stage 6).

The mackerel stomachs in January were mostly empty (83.8%). (Table 8). The more intensive feeding have already begun in February when 31.4% in Division 6A and 49% in Division 6B of stomachs filled with food to less than 50% (second degree) were found. The highest proportion of stomachs filled above 50% of their volume (45.7%) was present in Division 6B in March.

Table 1 Polish catches in NAFO Subareas 1 - 5 and Statistical Area 6 in 1988 and 1989 (metric tons)

Species	1988		1989	
	Tons	%	Tons	%
Atlantic cod	6	0.1	-	-
Atlantic redfish	36	0.3	8	0.1
American plaice	41	0.3	84	0.9
Witch flounder	760	6.4	691	7.4
Greenland halibut	904	7.6	360	3.9
Atlantic halibut	3	+	+	+
Roundnose grenadier	17	0.1	17	0.2
Wolffishes	18	0.2	-	-
Atlantic herring	102	0.9	288	3.1
Atlantic mackerel	9802	82.5	7653	82.0
Atlantic menhaden	1	+	-	-
Spiny dogfish	52	0.4	47	0.5
Dogfish sharks	16	0.1	-	-
Skates	64	0.5	-	-
Blueback Herring	13	0.1	6	0.1
American shad	1	+	-	-
Alewife	17	0.1	18	0.2
Butterfish	1	+	-	-
Scup	17	0.1	-	-
Porgies	8	0.1	84	0.9
Silver hake	-	-	8	0.1
Sea robins	-	-	6	0.1
Haddock	-	-	4	0.0
BSI	-	-	1	0.0
Other finfish	1	+	53	0.6
Squids	-	-	1	0.0
total	11860	99.9	9329	100.0

Table 2 Polish allocations versus catches in NAFO Area in 1989 (metric tons)

Species	Stock division	Catch quotas	Catches	catch quota (%)
Atlantic cod	26H	725	-	0.00
Greenland halibut	26H	2000	-	0.00
Greenland halibut	2J + 3KL	500	360	72.00
Witch flounder	2J + 3K	765	691	90.33
Atlantic redfish	2 + 3K	260	8	3.08
Roundnose grenadier	2 + 3	800	17	2.13
Atlantic mackerel	5 + 6	9000	7598	84.42
Capelin	2 + 3	840	-	0.00
Squid - Illex sp.	3 + 4	1000	-	0.00

Table 3 Polish catches in NAFO Subarea 3, Division 3K
by month in 1989 (metric tons)

Species	Month			Total
	January	February	March	
Atlantic redfish	1	7	-	8
Roundnose grenadier	1	12	4	17
American plaice	32	18	34	84
Witch flounder	18	214	459	691
Greenland halibut	287	27	46	360
Total	339	278	543	1160

Table 4 Polish catches in NAFO Subarea 4, Divisions 4X and 4W
in May 1989 (metric tons)

Species	Division		Total
	4X	4W	
Atlantic mackerel	1	54	55
Atlantic herring	-	151	151
Spiny dogfish	-	26	26
Haddock	-	4	4
Total	1	135	136

Table 5 Length frequencies of Polish mackerel catches in Divisions 6A, 6B, 5Zw and 4W in 1989

(per cent)

Length -class	Division/month								
	6A January	6A February	6A March	6A April	6B February	6B March	6B April	5Zw April	4W May
19	-	-	-	-	-	-	-	0.6	-
20	-	-	-	-	-	-	-	-	-
21	0.1	-	-	-	-	-	-	-	-
22	0.1	-	-	-	-	0.2	-	-	-
23	0.2	0.1	-	-	-	0.4	0.1	-	-
24	1.7	0.9	-	-	-	1.2	0.9	-	-
25	3.5	1.6	0.1	-	0.3	3.0	2.9	-	-
26	3.2	1.8	0.2	-	-	2.7	2.3	0.1	0.6
27	6.4	2.5	0.6	-	0.1	3.0	2.1	0.1	12.2
28	7.2	4.4	1.7	0.1	0.2	3.2	2.6	0.1	39.7
29	5.7	4.3	2.1	0.2	0.5	2.6	1.8	0.3	22.0
30	3.0	3.1	1.6	0.2	0.7	1.1	1.5	0.3	3.4
31	1.4	1.6	1.2	0.7	1.0	0.4	1.5	0.2	0.6
32	2.5	3.2	3.1	1.2	3.0	0.7	2.7	0.6	1.5
33	4.3	5.0	5.4	3.2	5.9	2.9	5.6	1.4	4.3
34	5.6	6.9	6.5	5.3	7.2	3.6	7.6	2.2	3.4
35	9.0	11.2	12.6	11.7	16.8	11.3	11.9	6.2	2.4
36	16.6	19.2	23.4	26.0	25.8	21.1	21.6	23.6	3.3
37	16.5	19.1	21.9	27.6	21.4	25.2	19.8	20.4	3.1
38	9.7	9.9	12.7	15.9	11.4	11.4	10.4	19.5	2.1
39	2.9	2.6	3.6	4.2	3.0	2.4	2.7	9.6	0.6
40	1.1	1.0	1.4	1.7	1.4	1.3	1.1	2.4	0.4
41	0.5	0.6	0.7	0.6	0.5	1.0	0.3	1.2	0.1
42	0.5	0.5	0.6	0.6	0.2	0.7	0.3	1.2	-
43	0.3	0.4	0.2	0.5	0.4	0.2	0.3	0.7	-
44	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.3	-
45	0.1	0.1	-	-	0.1	-	-	0.1	-
46	-	-	-	-	-	0.1	-	-	-
Total (%)	100.1	100.1	99.8	99.8	100.1	99.9	100.0	99.9	99.9
Number measured	5519	4656	4937	4937	1033	823	4962	1393	1735

Table 6 Age composition of Polish mackerel catches in 1989 (per mille)

Division	Month	Age group / year-class							
		1/88	2/87	3/86	4/85	5/84	6/83	7/82	8/81
6A	January	2.0	208.4	163.1	142.1	173.8	150.0	115.5	26.4
6A	February	1.0	99.1	185.9	196.0	304.7	140.1	46.4	19.0
6A	March	-	54.7	96.8	126.6	409.0	190.5	103.0	12.7
6A	April	-	6.0	67.9	92.5	324.3	371.8	110.3	13.5
6B	February	-	8.1	151.5	77.7	421.6	246.0	87.0	0.6
6B	March	1.2	163.4	60.6	291.2	246.7	216.3	1.6	12.6
6B	April	1.2	138.5	125.2	135.4	244.3	271.8	70.6	5.2
52w	April	-	17.4	47.1	114.4	672.8	60.4	62.4	3.9
4W	May	-	755.2	117.0	40.3	61.8	20.6	3.9	-

Division	Month	Age group / year-class						
		9/80	10/79	11/78	12/77	13/76	14/75	15+
6A	January	11.0	2.0	2.3	1.7	0.6	0.6	0.5
6A	February	2.5	2.8	1.3	0.2	0.3	0.7	-
6A	March	2.0	2.4	1.4	0.7	0.1	0.1	0.1
6A	April	2.8	2.7	2.9	2.6	1.7	0.6	0.5
6B	February	0.6	3.2	2.9	-	0.6	-	-
6B	March	2.5	0.4	1.0	1.2	-	1.2	-
6B	April	3.0	0.7	1.1	1.6	0.3	0.8	0.4
52w	April	8.1	4.0	1.2	4.3	3.4	-	0.7
4W	May	-	-	-	-	-	-	-

Table 7 Gonad's maturity of mackerel caught in NAFO Divisions 6A, 6B, 52w, 4X and 4W from January to May 1989

Maturity stage		Division/month									
		6A January	6A February	6A March	6A April	6B February	6B March	6B April	52w April	4X May	4W May
I	(%)	219.4	87.7	14.4	1.6	4.8	137.3	82.4	5.8	-	241.1
	(No.)	96	45	15	11	5	9	38	2	-	6
II	(%)	746.4	166.5	51.2	6.2	12.6	38.3	58.1	2.9	-	259.7
	(No.)	274	61	38	26	7	4	39	1	-	9
III	(%)	35.0	404.8	245.9	17.6	300.7	233.5	34.1	-	-	220.5
	(No.)	22	89	76	51	21	13	38	-	-	10
IV	(%)	-	299.5	609.0	411.2	651.5	575.6	405.9	96.9	89.8	78.6
	(No.)	-	69	164	264	34	24	143	9	3	3
V	(%)	-	41.3	78.7	594.4	30.4	45.3	419.1	728.8	707.9	165.4
	(No.)	-	5	38	323	7	7	182	52	34	37
VI	(%)	-	-	-	14.0	-	-	0.4	160.5	202.4	33.5
	(No.)	-	-	-	17	-	-	1	10	14	6

Remarks: - all shares denoted by (%) are calculated as per mille values
- numbers (No.) refer to number of fish analysed
- shares have been calculated on maturity - length key basis

Table 8 Stomach fullness of mackerel caught in NAFO Divisions 6A, 6B, 5Zw, 4X and 4W from January to May 1989

Degree of stomach fullness		Division/month									
		6A January	6A February	6A March	6A April	6B February	6B March	6B April	5Zw April	4X May	4W May
0	(%)	838.4	167.1	199.7	85.2	-	111.2	9.5	-	19.8	189.3
	(No.)	325	42	66	61	-	4	7	-	3	8
1	(%)	98.8	301.2	212.0	211.5	114.4	133.1	213.2	154.9	150.5	268.7
	(No.)	44	96	71	146	12	9	101	9	6	19
2	(%)	46.8	314.6	225.5	268.9	490.3	143.3	377.1	123.7	442.4	351.3
	(No.)	16	74	79	178	31	16	155	12	23	31
3	(%)	13.0	197.7	225.6	216.5	278.9	456.7	272.6	202.7	207.2	108.7
	(No.)	6	50	71	157	19	17	125	19	8	15
4	(%)	2.9	19.2	136.9	218.0	116.3	155.8	127.7	513.7	180.1	80.9
	(No.)	1	7	45	150	12	11	53	34	11	3

Remarks: - all shares denoted by (%) are calculated as per mille values
- numbers (No.) refer to number of fish analysed
- shares have been calculated on stomach fullness - length key basis

Table 9 Polish catches in NAFO Subarea 5 and Statistical Area 6, 1989 (metric tons)

Species	Division			Total
	5Zw	6A	6B	
Atlantic mackerel	223	5892	1483	7598
Atlantic herring	22	62	53	137
Alewife	-	18	-	18
Spiny dogfish	1	18	2	21
Silver hake	1	7	-	8
Blueback herring	-	5	1	6
Porgies	-	46	38	84
Sea robins	-	4	2	6
Haddock	-	-	-	-
BSX	-	-	1	1
Other finfish	-	13	2	15
Squid - Illex sp.	-	1	-	1
Total	247	6066	1582	7895

Table 10 Polish mackerel catches by NAFO division and month in 1989 fishing season (metric tons)

Division	Month					Total
	January	February	March	April	May	
4W	-	-	-	-	54	54
4X	-	-	-	-	1	1
5Zw	15	-	-	173	35	223
6A	1612	1499	1424	1357	-	5892
6B	204	386	95	798	-	1483
Total	1831	1885	1519	2228	90	7653

Table 11 Age-length key for herring from NAFO Division 4W, May 1989

Length class	Number analyzed	Number measured	AGE GROUP								Per cent
			2	3	4	5	6	7	8	9	
24	2	2	2	0	0	0	0	0	0	0	0.2
25	1	1	1	0	0	0	0	0	0	0	0.1
26	1	1	0	1	0	0	0	0	0	0	0.1
27	1	1	0	1	0	0	0	0	0	0	0.1
28	1	1	0	0	1	0	0	0	0	0	0.1
29	9	29	0	0	26	3	0	0	0	0	2.5
30	11	71	0	0	45	26	0	0	0	0	6.1
31	14	115	0	0	25	82	8	0	0	0	9.9
32	14	378	0	0	27	243	108	0	0	0	32.7
33	13	296	0	0	0	137	137	23	0	0	25.6
34	14	187	0	0	0	27	147	13	0	0	16.2
35	11	61	0	0	0	0	11	39	6	6	5.3
36	3	14	0	0	0	0	0	9	0	5	1.2
89		1157									
Total			3	2	124	518	411	84	6	10	
per mill			2.6	1.7	106.8	447.3	355.1	72.8	4.8	8.8	
mean length			24.3	26.5	30.4	32.1	33.1	34.4	35.0	35.5	

Table 12 Maturity stage-length key for herring from NAFO Division 4W, May

Length class	Number analyzed	Number measured	MATURITY STAGE						per cent
			1	2	3	4	5	6	
20	1	1	1	0	0	0	0	0	0.1
21	1	1	1	0	0	0	0	0	0.1
22	1	1	1	0	0	0	0	0	0.1
23	1	1	1	0	0	0	0	0	0.1
24	2	2	2	0	0	0	0	0	0.2
25	1	1	1	0	0	0	0	0	0.1
26	1	1	0	1	0	0	0	0	0.1
27	1	1	0	1	0	0	0	0	0.1
28	1	1	0	1	0	0	0	0	0.1
29	16	29	0	24	4	0	2	0	2.5
30	20	71	0	57	14	0	0	0	6.1
31	23	115	0	85	30	0	0	0	9.9
32	26	378	0	247	131	0	0	0	32.5
33	26	296	0	159	114	0	11	11	25.5
34	25	187	0	60	120	0	7	0	16.1
35	21	61	0	15	46	0	0	0	5.2
36	8	14	0	5	9	0	0	0	1.2
37	1	1	0	0	1	0	0	0	0.1
176		1162							
Total			7	655	468	0	21	11	
per mille			6.0	563.3	403.1		17.8	9.8	
mean length			22.7	32.1	33.0		33.0	35.0	

Table 13 Degree of stomach fullness-length key for herring from NAFO Division 4W, May 1989

Length class	Number analyzed	Number measured	STOMACH'S FULLNESS					per cent
			0	1	2	3	4	
20	1	1	1	0	0	1	0	0.1
21	1	1	0	1	0	0	0	0.1
22	1	1	1	0	0	0	0	0.1
23	1	1	1	0	0	0	0	0.1
24	2	2	1	1	0	0	0	0.2
25	1	1	0	1	0	0	0	0.1
26	1	1	1	0	0	0	0	0.1
27	1	1	0	1	0	0	0	0.1
28	1	1	1	0	0	0	0	0.1
29	16	29	4	9	9	5	2	2.5
30	20	71	7	14	18	21	11	6.1
31	23	115	30	10	35	20	20	9.9
32	26	378	102	73	102	58	44	32.5
33	26	296	46	57	57	80	57	25.5
34	25	187	37	67	30	30	22	16.1
35	21	61	15	15	9	20	3	5.2
36	8	14	2	2	2	4	5	1.2
37	1	1	1	0	0	0	0	0.1
176		1162						
Total			249	250	261	239	164	
per mille			214.0	215.6	224.5	206.0	140.8	
mean length			32.3	32.6	32.2	32.5	32.5	