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An assessment on American plaice in Division 3M

by

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Introduction

The stock mainly occurs on Flemish Cap at depths shallower than 600m. Catches from member countries come mainly as by catch from trawl fisheries directed for other species in this Division.

Since 1974, when this stock started to be regulated, catches ranged from 600 t in 1981 to 5 600 t in 1987. After that catches presented a declining trend to 275 t by 1993, caused in part by a reduction in directed effort by the Spanish fleet which took place in 1992. Catch for 1996 was estimated to be 300 t. Half of this catch was made by NAFO non members countries.

From 1979 to 1993 a TAC of 2000 t has been in place for this stock. A reduction to 1000 t was decided for 1994 and 1995 and a moratoria was agreed to thereafter (Fig. 1).

Recent TAC and Catch ('000) are as follows:

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
TAC	2	2	2	2	2	2	2	1	1	0	0
Catch	5.6	2.8	3.5	0.8	1.6	0.8	0.3	0.7 ¹	1.3 ¹	.3	

¹ Provisional

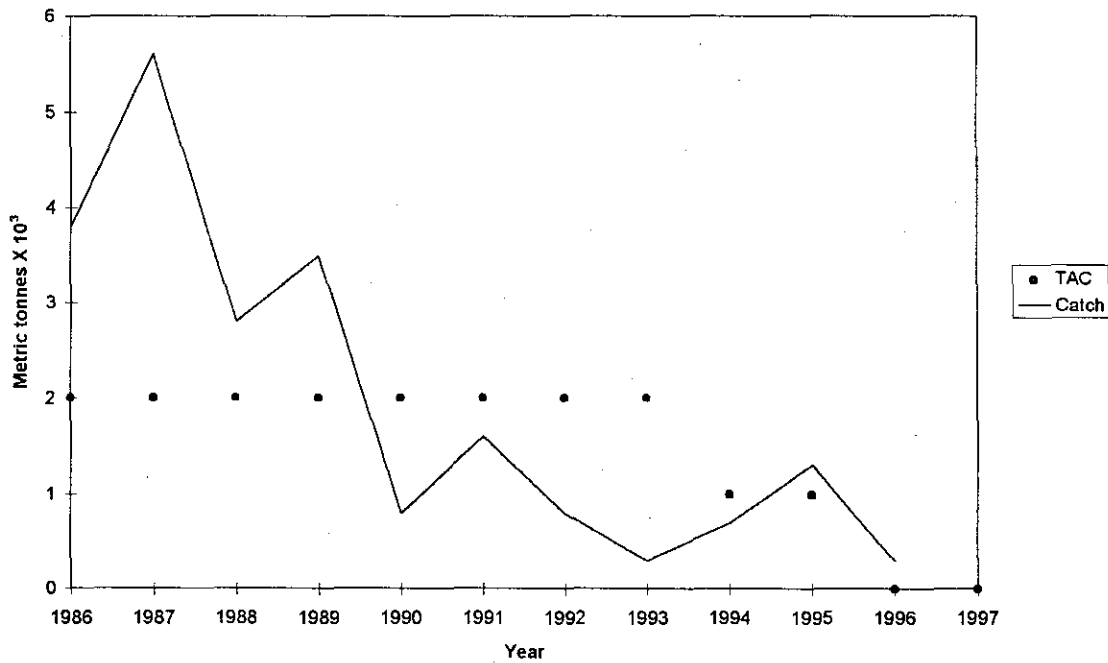


Fig. 1.- Nominal catches and agreed TAC for American plaice stock in División 3M.

Input Data

Commercial fishery data

Portugal and Spain provided length composition of the trawl catches. Biological information for Portuguese catches is only available for the 4th quarter (23 samples). This information was used to estimate the length composition of the 150 t catches by the non member countries. The age composition of the Portuguese catches was obtained using the age-length key derived from the 1996 Flemish Cap bottom trawl survey. The 1990 and 1991 year classes appear as the most abundant ones. Results are presented in Table 1.

Table 1.- Catch at age matrix for the period 1988-95

Age	1988	1989	1990	1991	1992	1993	1994	1995	1996
3	34	188	11	14	15	27	5	21	10
4	204	150	184	102	30	30	222	166	95
5	642	507	57	545	86	70	94	445	241
6	1161	998	95	288	282	86	77	368	350
7	790	1041	169	412	73	79	82	307	95
8	1003	499	229	363	148	39	289	217	82
9	289	446	156	222	133	23	28	183	40
10	93	213	69	63	62	19	55	22	47
11	24	169	10	7	36	2	19	36	10
12	52	40	2	3	19		19	52	8
13	55	20	2	0	22		22	41	10
14	14	8	1	0	0		46	24	8
15	27	0	0	0	0		46	32	5

Mean weight at age in the catch are presented in Table 2 and do not indicate any trend, although 1996 mean weight at age in 1996 were bellow average for most of the age groups.

Table 2.- Mean weight at age in the catch for the period 1988-96

Age	1988	1989	1990	1991	1992	1993	1994 ₂	1995 ₂	1996	Mean
								0.037		0.037
3	0.181	0.247	0.237	0.117	0.201	0.145	1.144	0.159	0.253	0.298
4	0.264	0.371	0.358	0.304	0.292	0.271	0.282	0.275	0.323	0.304
5	0.293	0.449	0.488	0.472	0.456	0.377	0.436	0.435	0.442	0.428
6	0.445	0.681	0.579	0.619	0.649	0.611	0.510	0.577	0.588	0.584
7	0.619	0.867	0.845	0.873	0.754	0.915	0.594	0.632	0.737	0.760
8	0.864	0.960	0.992	1.064	0.978	1.303	0.752	0.775	0.823	0.946
9	1.001	1.156	1.101	1.282	1.183	1.265	0.895	1.023	0.975	1.098
10	1.198	0.975	1.125	1.380	1.271	1.468	0.868	1.150	0.915	1.150
11	1.233	1.588	2.006	1.477	1.491	1.731	0.976	1.354	1.158	1.446
12	1.504	1.481 ₁	1.887	1.671	1.645		0.976	1.386	1.296	1.481
13	1.806	1.574 ₁	1.726		1.997		1.215	1.526	1.172	1.574
14	1.674	1.588 ₁	1.758				1.500	1.626	1.383	1.588
15								1.526	1.537	1.532
16								1.709	1.330	1.520

₁ Estimated as a mean from the remaining years.

₂ Derived from the EU survey.

Research survey data

The series of research surveys conducted by the EU since 1988 was continued in July 1996. The Russian survey series started in 1983 was interrupted in 1994. A new Canadian series started in 1996, but with only one data point available, results are not comparable with the former Canadian series in this area. A continuous decreasing trend in both the indices of abundance and biomass was observed since the beginning of the EU series. Russian series, although presenting a higher variability, also show a decreasing trend between the 1986 - 1993 period (Table 3, Fig. 2).

Table 3.- Trend in biomass and abundance showed by the surveys.

Year	EU-Num	EU-Biom.	R.-Num.	R.-Biom.	C-Num.	C-Biom.
1983				8900		
1984				7500		
1985				7800		
1986				20200		
1987				9300		
1988	21219	11868	10000	6500		
1989	20500	10533	8300	5000		
1990	16631	9101	2600	1200		
1991	13932	7565	12700	14400		
1992	10363	6492	1900	1000		
1993	9268	5949	3600	2700		
1994	8538	6173				
1995	7100	5087				
1996	4321	3073			3200	2400

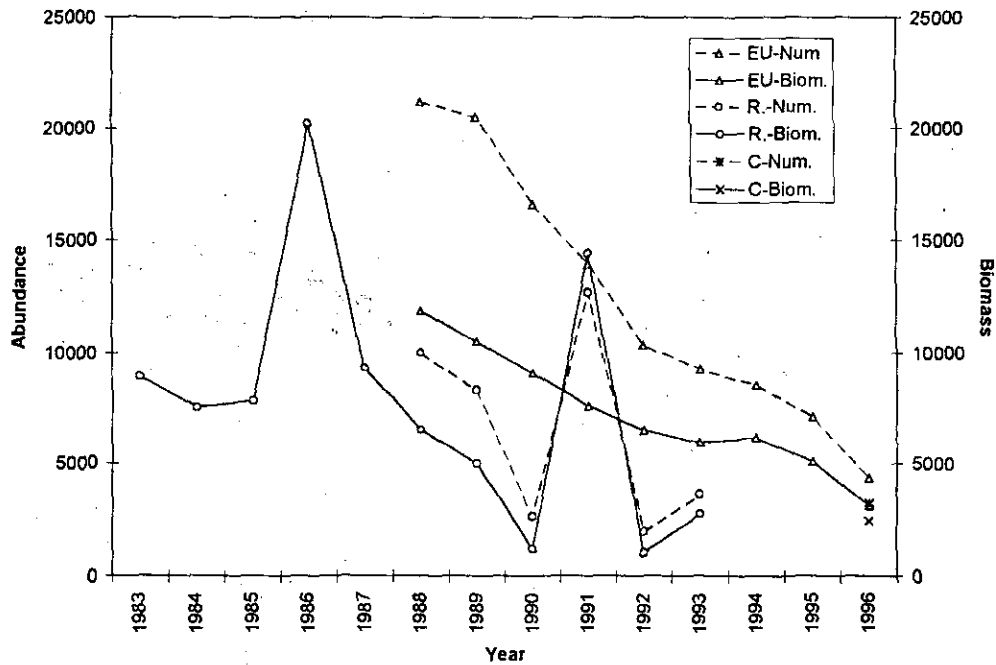


Fig. 2.- Trends in biomass and abundance in the surveys.

During the survey series the age reader was changed three times, an age compositions of the survey may reflect different criteria. During 1996 a revision of 1995 American plaice aging took place in order to have a continuous four years period aged by the same reader, which resulted in a more coherent age composition of the catch for the last 4 years, but there are still inconsistencies (Table 4). The 1996 and 1990 year-classes continue to be the strongest of the series. Since 1991 a series of very poor year-classes are indicated by the EU research survey, the weakness of which were confirmed in the following years.

Table 4.- Age composition of A. plaice in the EU survey series.

Age	1988	1989	1990	1991	1992	1993	1994	1995	1996
2	2284	454	359	309	736	9	34	19	28
3	625	6847	775	911	679	1365	40	99	103
4	3040	1500	7083	1877	910	969	1789	627	222
5	1975	3238	897	4461	1471	643	782	1620	465
6	3020	3006	2475	1836	3423	320	651	990	1236
7	4154	2868	1717	2009	913	3110	703	988	656
8	4258	1691	1657	1566	1090	339	2487	665	411
9	1492	587	1030	675	624	592	243	1132	308
10	207	261	485	232	289	296	480	128	470
11	109	34	90	8	138	198	166	143	113
12	61	14	15	48	74	229	164	119	63
13			31		16	280	195	119	67
14			17			865	398	241	90
15						28	397	183	62
16						35	9	27	20
Total	21225	20500	16631	13932	10363	9278	8538	7100	4314

The spawning stock biomass (50% age 5 + age 6+), as estimated from the EU surveys, increased in 1993 to a value close to 1991, but decreased since 1995 (Table 5). The level in 1996 was only a 34% of the 1988 level, the lowest point observed in the survey serie (1988-96). This decreasing trend is expected to be continued as no strong year classes will recruit to the SSB in the near future.

Table 5.- Trends in the SSB index showed by the survey.

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996
SSB	8.5	5.8	5.3	5.7	3.6*	5.0	5.0	4.3	2.9

* Estimating using mean weight at age in the catch

Estimation of parameters

Taking into account the deficiencies in the data base, only a crude approximation of the trend in fishing mortality could be obtained, by comparing the catch, and survey biomass ratio for ages fully recruited to the fishery (8-11).

For 1996 the F index was 0.13, which indicate a decrease to half the level observed in 1995 (Table 6; Fig. 3). However all the indices of this stock are going down and there in no sign of recovery.

Table 6.- Trend in F index for the period 1988-96.

Year	Catch	Survey	C/B
1988	1298	6066	0.21
1989	1470	2573	0.57
1990	497	3262	0.15
1991	768	2481	0.31
1992	435	2141	0.20
1993	111	1075	0.10
1994	309	2666	0.12
1995	429	1580	0.27
1996	161	1199	0.13

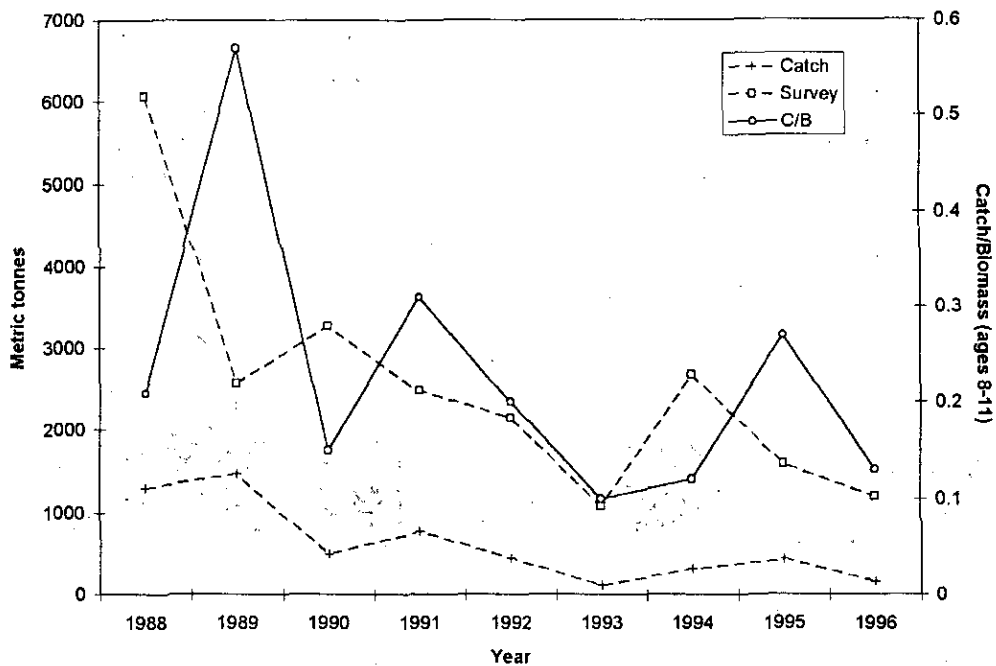


Fig. 3.- Trend in F index for A. plaice in Div. 3M.

