

Northwest Atlantic



Fisheries Organization

Serial No. N1803

NAFO SCR Doc. 90/81

SCIENTIFIC COUNCIL MEETING - JUNE 1990

An Assessment of the American Plaice Stock on the  
Flemish Cap (NAFO Division 3M)

by

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INTRODUCTION

This stock has been regulated since 1974, when a TAC of 2000 Tm was agreed. That TAC has been maintained with the exception of only 1978 when an increased of 4,000 Tm was agreed.

Until 1985 landings were between 600 and 1,900 Tm, which were taken as a by-catch of a fishery directed to cod and redfish by the Soviet Union. Since 1985 catches have increased, due in part, to a fishery directed to this species by the EEC (Spain and Portugal), resulting in landings of 3,800 Tm in 1986 and 5,600 in 1987. In 1988 a moratorium on cod fishing was agreed in this division and catches of American plaice decreased to 2,861 Tm and reaching 3,405 in 1989.

Exploitation levels in this fishery are not very accurate because of the lack of information in catches made by countries not belonging to NAFO.

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
TAC (000)	2	2	2	2	2	2	2	2	2	2
CATCH (000)	1.2	0.6	1.1	1.9	1.3	1.7	3.8	5.6	2.8	3.5

Input data

a) Sampling of the catches

Length compositions for the Spanish catches are available for four months in 1988, length and age compositions for two months in 1989. The maximum sizes recorded in the length distributions were 39 cm in 1988 and 35-37 in 1989.

b) Research vessel survey data

The stratified surveys carried out by the Soviet Union show from 1983 to 1987 a relatively stable biomass (7,500-9,300), without taking into account the high value obtained in 1986. In 1988 began a decrease in the biomass obtaining in 1989 the lower value of the serie 5,000 Tm.

YEAR	1983	1984	1985	1986	1987	1988	1989
BIOMASS (000)	8.9	7.5	7.8	20.2	9.3	6.5	5.0

The EEC has made two surveys in 1988 and 1989 obtaining a biomass of 11,868 and 10,533 Tm. The reduction in biomass from 1988 to 1989 relates to the reproductive stock with a diminution in the mature female biomass of 24%, changing from 6,140 Tm in 1988 to 5,259 in 1989. A rejuvenation in the population has occurred because of this decrease in mature females and the recruitment of the large 1986 year class, as reflected in the EEC surveys in 1988 and 1989.

Parameter estimation.

The yields per recruit were calculated with the average weights by age obtained in the EEC survey of July 1989, and the partial recruitments obtained when comparing the commercial catch with the capture in the EEC survey of 1989, table 1. The values of yield per recruitment are shown in figure 3. The estimate of  $F_{0.1} = 0.185$  and  $F_{max} = 0.40$ .

Catch prediction

Starting from the age composition of the population obtained in the EEC survey of July 1989 and using the compositions by ages of the spanish commercial catch in 1989, and with a catch for 1989 of 3,400 Tm and 2000 for 1990, we have calculated the population in January 1990 and 1991, table 2. The F value for 1989 obtained from these values is of 0.56.

The catches in 1991 corresponding to  $F_{0.1}$  and  $F_{max}$  are given from an underestimate of the population by the swept area method in the EEC survey, and these catches may be considered an underestimation of the catch corresponding to each value of F. On the other hand, we must take into account the lack of information of catches of countries not belonging to NAFO.

Table 1. Parameters used to calculate the yield per recruit (Y/R)

Age	Weight	Partial recruitment
2	63	0
3	126	0.11
4	283	0.21
5	444	0.36
6	574	0.78
7	765	1
8	903	1
9	1,156	1
10	1,324	1
11	1,663	1
12	2,009	1

Table 2. Values used to calculate the catch prediction for 1991, with a catch for 1989 of 3,500 Tm and 2,000 for 1990.

Nc = Number of individuals by age obtained in the EEC survey of 1989

Cc = Composition by ages of the spanish catch in March and April 1989

N90 = Population composition by ages in January 1990

N91 = Population composition by ages in January 1991

Age	Nc	Cc	N90	N91
2	459	5	-	-
3	6,954	190	412	-
4	1,521	93	6,172	320
5	3,272	329	1,317	4,560
6	3,037	673	2,752	904
7	2,926	593	2,321	1,539
8	1,733	181	2,272	1,166
9	600	396	1,453	1,141
10	312	395	292	730
11			32	147
12				12

Table 3. Catches in 1981 for  $F_{0.1}$  and  $F_{max}$

	Catch (Tm)
$F_{0.1} = 0.185$	1,618
$F_{max} = 0.40$	3,226

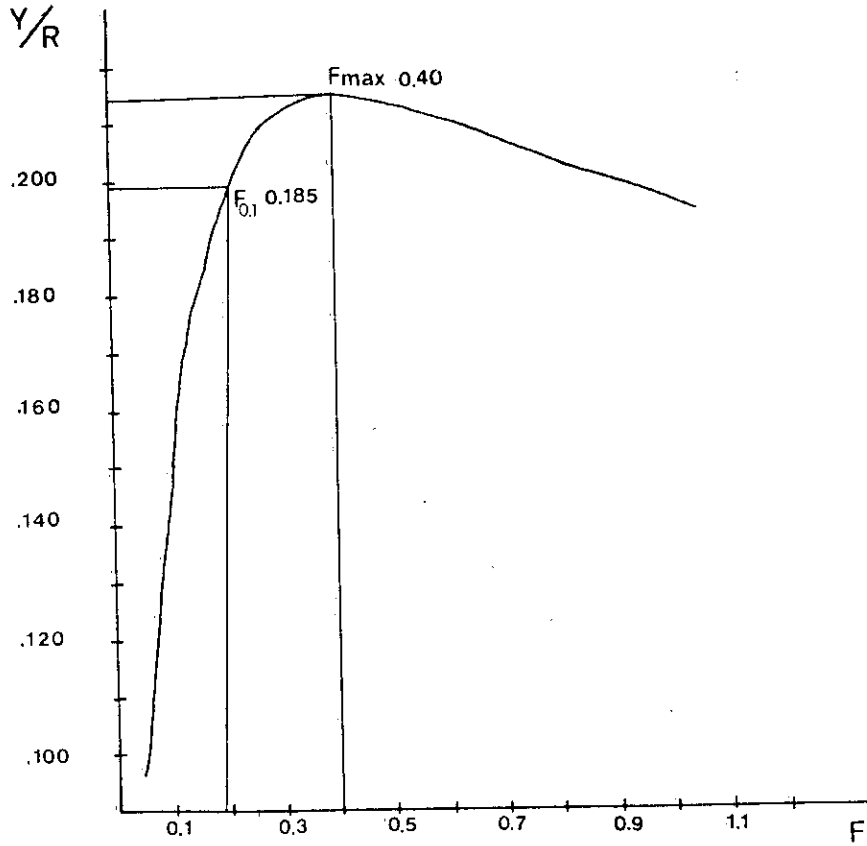


Figure 1. Yield per recruit (Y/R) of American plaice in 3M Division calculated with the values of table 1