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Results for American Plaice from Canadian Surveys in Div. 3M, 1978-85

by

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Introduction

Canada conducted research vessel surveys on Flemish Cap (NAFO Division 3M) from 1978-1985. This paper presents information on the distribution and abundance of American plaice from these surveys. These data should be useful for comparisons with USSR surveys during this period and with EEC surveys which have been carried out since then.

Methods and materials

Surveys were done with the research vessel GADUS ATLANTICA, a stern trawler of 74 m in length, fishing with a lined Engels 145 otter trawl. The surveys were conducted in January-February of each year from 1978-85, using a stratified random design with the stratification scheme shown in Fig. 1. Fishing sets were usually of 30 minutes duration, over a distance of 1.75 nautical miles, and covered depths between 130 and 728 m. All strata were surveyed each year, with the exception of 1982, when 4 deeper strata were omitted (Table 1). Catch numbers and weights, length frequencies, and otoliths were collected from American plaice in the usual manner during each survey.

Results and discussion

On Flemish Cap, American plaice were highest in abundance in shallower strata, generally less than 366 m (Tables 1 and 2). In many of the years, stratum 4 (182-255 m) had the highest mean number or weight per tow of the 19 strata surveyed. Few A. plaice were found in water deeper than 546 m. Largest catches on average occurred in the 151-250 m depth range, in a temperature range of 3.9 to 4.3 degrees C (Fig. 2). This is more likely a function of depth, as bottom temperatures on Flemish cap exhibited little variability during the surveys. These temperatures are also higher than the temperatures where most of the A. plaice in the adjacent Grand Bank stock are usually found.

Figs. 3 and 4 shows the trends in abundance and biomass (swept area estimates) respectively of A. plaice in the surveys. The biomass estimates ranged from 2900 t in 1982 to 12,000 t in 1980. The substantial variability from year to year was caused mainly by the recruitment of strong year-classes (Fig. 5). The population structure was often dominated by one year-class, for example the 1973 year-class in 1978 and 1979, and the 1979 year-class in 1983-1985 (Fig. 6). In the 1985 survey, the 1979 and 1980 year-classes comprised more than 80% of the estimated population abundance.

Table 1. Average number of American plaice per tow, for strata on Flemish Cap, from surveys conducted from 1978 to 1985.

Stratum	Approx. depth range (m)	1978	1979	1980	1981	1982	1983	1984	1985	Average
1	128-146	13.4	2.0	3.8	9.2	4.0	3.8	12.0	22.1	8.8
2	147-183	70.6	2.5	3.4	5.0	7.4	32.6	16.6	11.3	18.7
3	184-256	46.6	7.3	5.4	6.8	3.3	14.0	13.8	14.3	13.9
4	"	16.0	3.5	244.0	70.4	26.4	178.0	57.3	12.5	76.0
5	"	14.2	4.2	7.5	4.6	5.4	56.6	24.6	10.4	15.9
6	"	18.8	22.5	13.0	15.7	8.4	46.4	25.3	44.5	24.3
7	257-366	9.6	4.3	1.9	1.9	5.6	14.2	17.5	7.0	7.8
8	"	6.9	50.3	2.8	2.2	1.4	5.8	5.3	3.4	9.8
9	"	11.3	3.3	4.3	3.5	7.3	12.0	6.5	5.5	6.7
10	"	14.3	4.3	7.4	6.0	14.4	13.6	29.1	13.8	12.9
11	"	9.3	8.0	7.8	7.1	6.4	16.0	20.2	30.2	13.1
12	367-549	2.0	2.3	0.8	0.7	1.0	4.1	4.8	2.1	2.2
13	"	1.0	1.0	0.0	0.3	1.0	0.7	0.0	0.7	0.6
14	"	7.1	8.7	14.4	10.0	8.1	3.1	23.3	50.0	15.6
15	"	4.7	9.8	7.5	2.8	-	10.2	19.3	24.9	11.3
16	550-732	0.3	0.8	0.4	0.4	-	0.3	0.5	0.9	0.5
17	"	1.5	2.0	0.0	0.0	-	24.5	0.3	0.0	4.0
18	"	11.5	0.0	5.3	4.7	-	0.3	1.0	0.0	3.3
19	"	7.2	3.7	2.4	1.4	-	0.6	1.0	2.4	2.7

Table 2. Average (kg) weight of American plaice per tow, for strata on Flemish Cap, from surveys conducted from 1978 to 1985.

Stratum	Approx. depth range (m)	1978	1979	1980	1981	1982	1983	1984	1985	Average
1	128-146	13.4	1.9	4.0	8.1	3.5	3.5	7.9	21.6	8.0
2	147-183	43.5	2.2	1.9	4.3	4.1	16.6	8.2	6.4	10.9
3	184-256	27.0	3.9	3.1	3.9	1.1	4.5	6.4	6.1	7.0
4	"	10.5	1.1	340.6	54.5	20.5	151.8	29.5	5.8	76.8
5	"	7.0	2.3	5.0	3.7	3.3	28.7	11.5	5.1	8.3
6	"	9.0	14.6	8.9	13.6	3.5	21.9	9.3	20.8	12.7
7	257-366	4.3	2.8	1.4	1.1	2.0	4.6	7.8	2.4	3.3
8	"	3.7	68.7	1.3	1.0	0.6	1.9	2.1	1.3	10.1
9	"	10.9	3.4	4.8	3.6	6.8	8.1	3.4	2.5	5.4
10	"	6.8	2.9	5.8	4.2	12.4	7.3	13.6	6.1	7.4
11	"	4.1	4.6	6.6	5.7	2.7	5.1	7.6	11.5	6.0
12	367-549	0.9	1.6	0.9	0.4	0.5	1.4	2.0	1.0	1.1
13	"	0.5	1.1	0.0	0.3	0.6	0.1	0.0	0.3	0.4
14	"	4.2	5.4	11.5	8.2	5.8	1.8	12.6	23.2	9.1
15	"	2.2	6.5	6.6	1.9	-	4.0	8.3	10.4	5.7
16	550-732	0.3	0.3	0.3	0.1	-	0.1	0.2	0.7	0.3
17	"	0.9	1.4	0.0	0.0	-	19.2	0.1	0.0	3.1
18	"	5.5	0.0	5.1	3.9	-	0.1	1.3	0.0	2.3
19	"	3.7	2.4	2.3	0.9	-	0.2	0.6	1.2	1.6

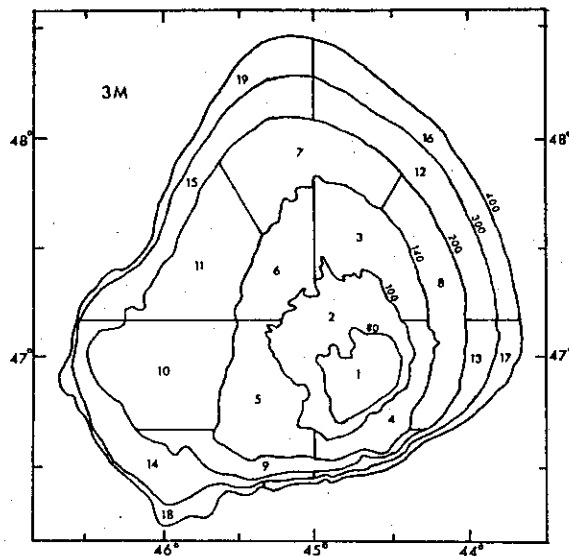


Fig.1. Stratification scheme used in groundfish surveys on Flemish Cap, 1978-1985.

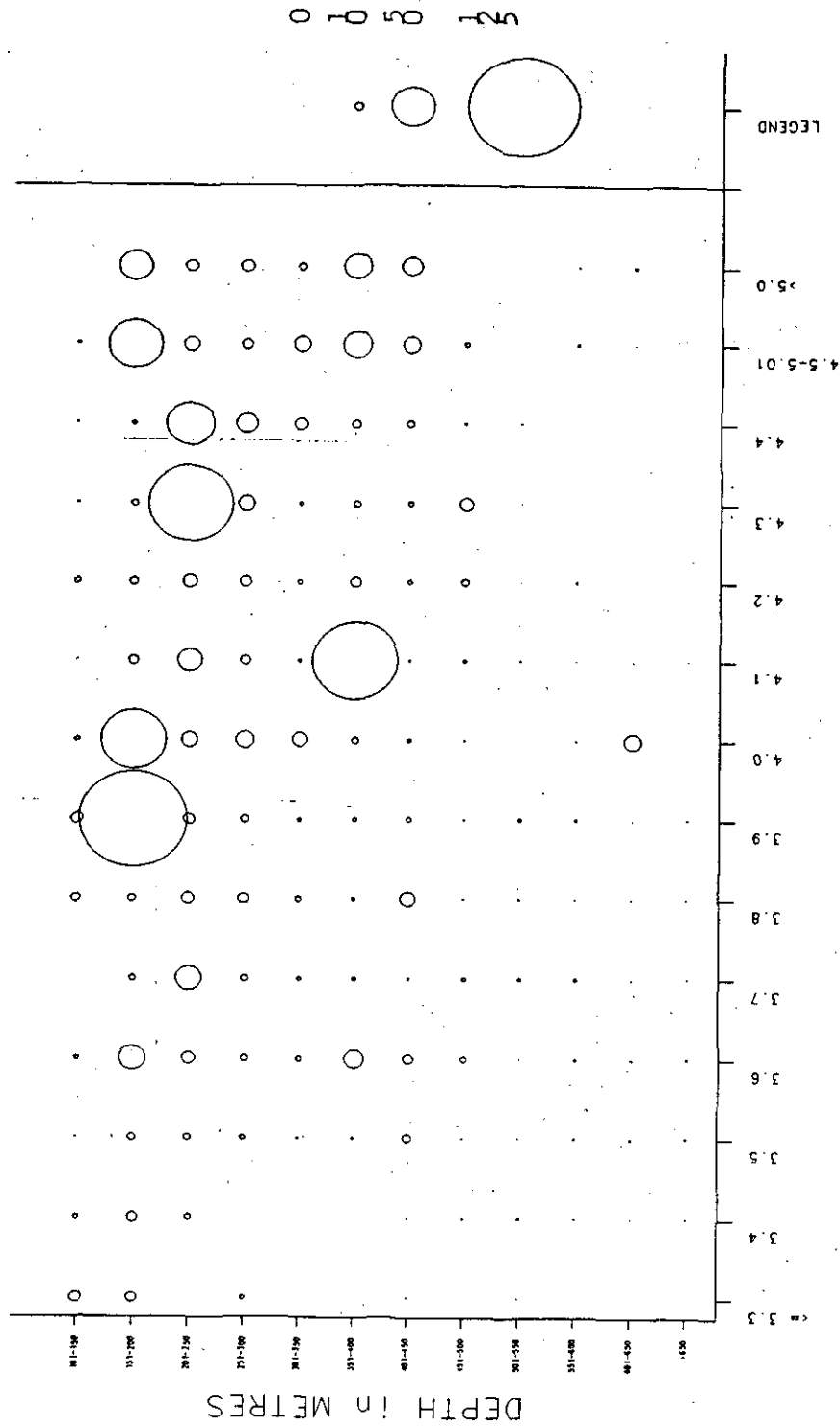


Fig. 2 Avg. catches(no./tow) of A. Plaice by depth and temperature.

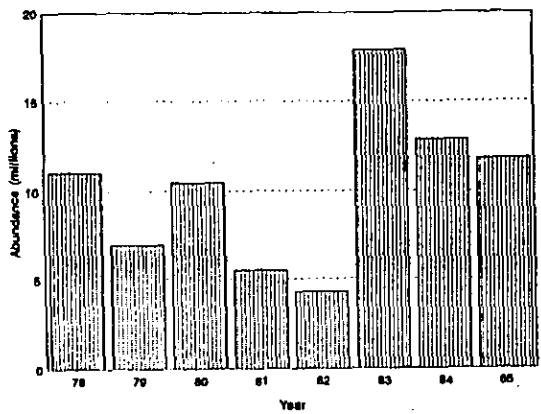


Fig. 3 Estimated total abundance of A. pluce from Canadian RV surveys on Flemish Cap from 1978-85.

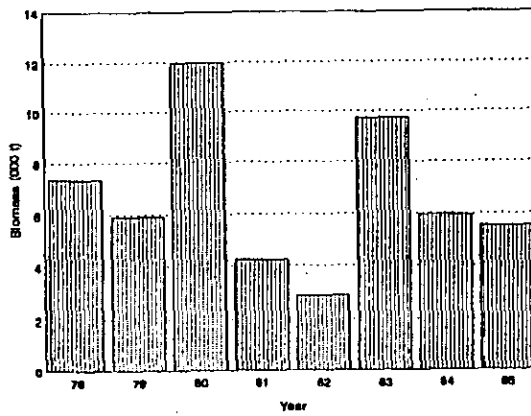


Fig. 4 Estimated biomass of A. pluce from Canadian RV surveys on Flemish Cap from 1978-85.

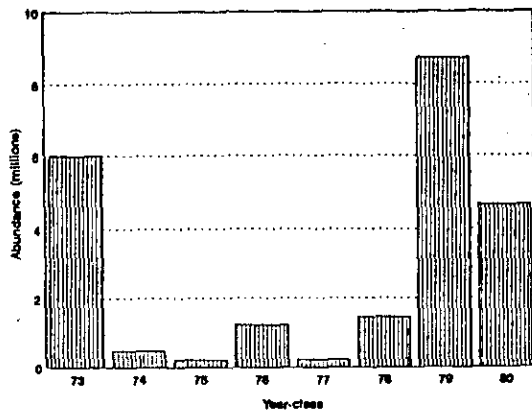


Fig. 5 Estimated year class strength of A. pluce, measured at age 5, from Canadian surveys on Flemish Cap from 1978-85.

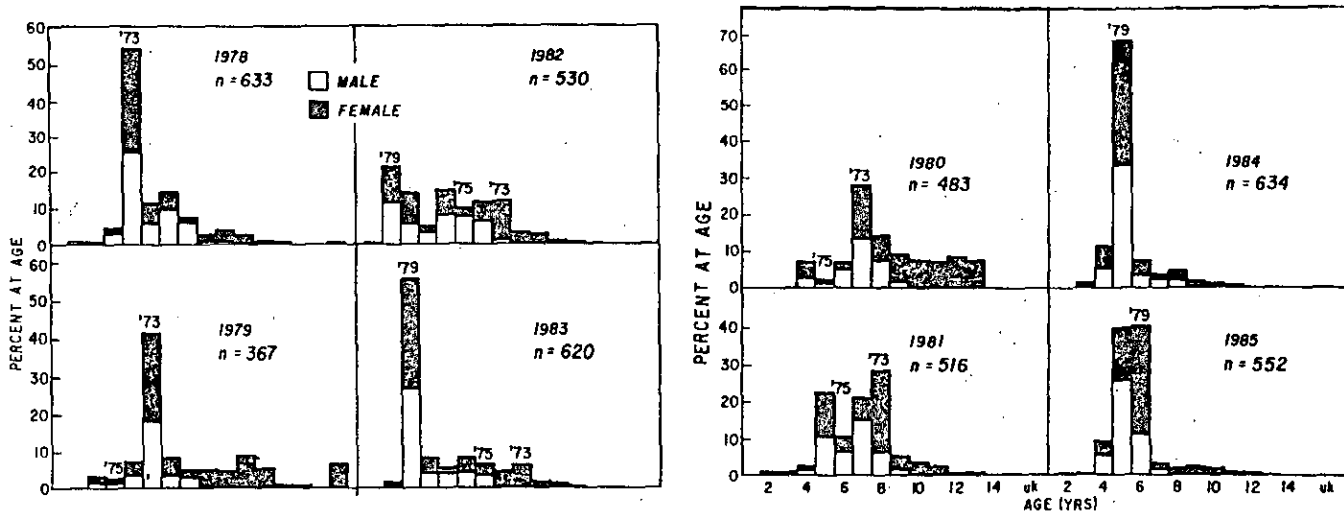


Fig. 6. Age composition of American plaice from surveys on Flemish Cap for each year from 1978 to 1985.