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An assessment of the Subdiv. 3Pn - Div. 4RS cod stock

by

J.-Paul Lussiaa-Berdou and Pierre Dubé
Direction générale des Pêches maritimes
Direction de la Recherche
Québec G1P 3W8

Fishery trends from 1961 to 1976

Cod catches from this stock increased from 56 000 t in 1959 and reached 103 000 t in 1970. Beginning in 1970, the figures show a sharp decrease as low as 55 000 t in 1972 and reach 77 000 t in 1975 and 73 000 t in 1976 (TABLE I). The annual mean catch has been 88 000 t for the 1960-1970 period and 75 000 t for the 1958-1976 period. As stated by Wiles and May (1968), the greater fluctuations occur in the trawlers catches operating in division 4R. These catches are taken mostly by french and portuguese trawlers between January and April of each year.

Production models

A simple production model (Schaefer 1954) has been used with two different standard units of CPUE.

In a first case, CPUE (t/h) of side trawlers from the maritime provinces of Canada of a tonnage varying from 25 to 49 t has been used. These boats operate only during summer mainly in division 4R.

In a second case, we used the CPUE (t/day) of french stern trawlers from 1 000 to 1 999 t. This fleet operates mostly during winter, from January and April in the divisions 4R and 3Pn. These trawlers entered the fishery in 1968 where they progressively replaced side trawlers of same tonnage. Within their tonnage category, their catches share increased from 4% in 1968 to 90% in 1976.

Using a linear regression between the catch rate of the two trawler classes for the periods 1968-1976 (Fig. 1), we have converted the side trawlers catch rate from 1960 to 1967 in catch rate of stern trawlers. This conversion

has also been made for 1969. For this particular year, the CPUE for french stern trawlers seems underestimated and we do not use it for regression. TABLE II gives the CPUE and the total effort calculated for the two chosen standard units. We have kept these standard units on account of the great difference existing between them. The small canadian trawlers operate during summer in division 4S, they have a low fishing power and their catch rate is very small for a great fishing effort whereas the french trawlers operate for a very short period of time, fishing mostly during winter in 4R and have a very high fishing power.

Production models (Figs 2 and 3) 80 300 and 84 700 t respectively for the canadian and french trawlers as MSY corresponding to efforts of 632 000 hours and 1 700 days. Two-thirds of the MSY effort gives respectively 42 000 hours and 1 133 days corresponding to catches in a population in equilibrium of 71 400 t and 75 300 t.

Discussions

Figure 4 shows a general tendancy for a decrease of CPUE more accentuate after the year of the greatest catches in 1970. This decrease of CPUE corresponds to an increase of the effort beginning in 1970 for the french trawlers and in 1973 for the maritime trawlers over the theoretic effort required for obtaining the MSY. There is a light increase of CPUE in 1976 for the maritime trawlers and in 1975 for the french trawlers but this has not been the case for the french trawlers for 1976.

The data from two surveys in May-June 1976 and May-June 1977 in divisions 4R, 4S and 3Pn give minimum biomass estimates that are 244 000 t and 196 500 t respectively, thus a reduction of 50 000 t with yields per standard set of 90 kg/30 min and 74 kg/30 min whereas the average yield of the Quebec trawlers (50' to 65' class) moves from 60 kg/h in 1976 to 68 kg/h in 1977.

REFERENCES

SCHAEFER, A.B. 1954. Some aspects of the dynamics of populations important to the management of the commercial marine fisheries. Intern. Am. Trop. Tuna Commn. I: 26-56.

WILES, M. and A. MAY, 1968. Biology and fishery of the West Newfoundland cod stock. ICNAF Res. Bull. 5: 5-43.

TABLE I. DISTRIBUTION OF CATCHES BY COUNTRIES IN ICNAF DIVISION 4R, 4S and 3P (January-April) (in metric tons).

YEAR	CANADA M Q	CANADA Nfld	FRANCE	PORTUGAL	ESPAGNE	OTHERS	4R	4R	3PN	TOTAL
1960	21996	20690	25684	14394	9187	604	66566	16503	9484	92553
1961	16718	19859	27816	15969	17984	0	47347	14445	36554	98346
1962	16653	27980	10850	14244	14761	0	48102	13171	22619	83892
1963	14778	32468	3775	9905	8783	0	42366	12176	17661	72203
1964	13274	26077	18305	13390	8466	525	58960	10142	11678	80708
1965	8958	26473	15634	13263	1585	430	43839	8355	14502	66696
1966	8590	26475	13708	11965	1379	448	44208	7253	10374	61835
1967	10370	24976	17105	7919	4739	5089	49941	8943	12000	70884
1968	11973	36421	26344	6905	4164	0	70029	7721	8704	86454
1969	18025	30482	16536	1330	2837	0	56632	9591	2987	69210
1970	19512	26604	30457	19275	8432	3	91146	9114	3039	103299
1971	11398	21640	24458	17964	5877	5	66362	9604	5540	81506
1972	12478	14867	13326	11084	1961	2459	37583	10297	6808	54688
1973	9028	17834	17642	27477	782	2593	43094	11411	7793	62298
1974	13308	16680	12160	6747	0	2250	39446	12977	11582	64005
1975	10538	16923	17154	12817	0	1672	41569	12431	5092	59092
1976	15933	24222	18087	10133	0	5419	56030	12486	5278	73794

TABLE II. CPUE AND TOTAL EFFORT FOR THE TWO STANDARDS UNITS USED FOR THE 1960-1976 PERIOD.

	CPUE		EFFORT	
YEAR	CANADIAN TRAWLERS 25-49 t/hr	FRENCH TRAWLERS 1000-1999 t/day	CANADIAN TRAWLERS 25-49 hrs	FRENCH TRAWLERS 1000-1999 days
1960	0,21	(60,15)	440 728	1539
1961	0,16	(67,04)	614 663	1467
1962	0,19	(112,67)	441 537	745
1963	0,17	(68,39)	424 723	1056
1964	0,16	(61,72)	504 875	1038
1965	0,17	(60,01)	392 329	1111
1966	0,15	(52,56)	412 233	1176
1967	0,13	(39,26)	545 261	1806
1968	0,15	62,57	576 360	1382
1969	0,15	(38,82)	461 400	1783
1970	0,14	49,70	737 850	2078
1971	0,13	41,56	626 969	1961
1972	0,12	22,91	455 733	2387
1973	0,10	20,54	622 980	3033
1974	0,08	37,02	800 062	1729
1975	0,07	44,62	844 171	1324
1976	0,09	27,58	820 044	2676

The figures between parenthesis are the results of the regression between CPUE of side and stern trawler catches.

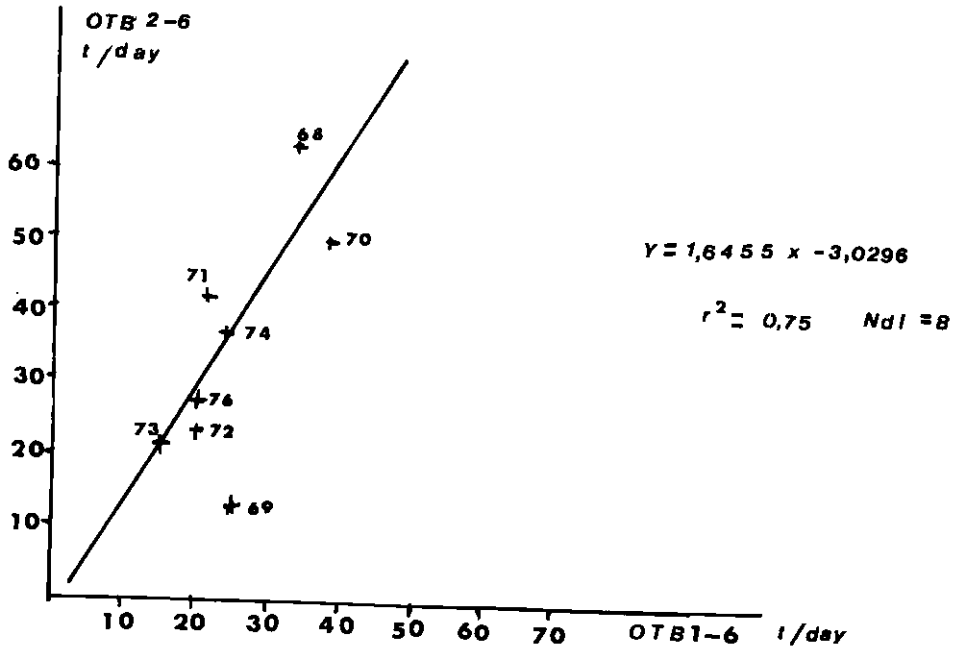

Fig. 1. Linear regression between french side trawlers of the 1 000 - 1 999 t class (OTB 1-6) and the french stern trawlers of the same class (OTB 2-6).

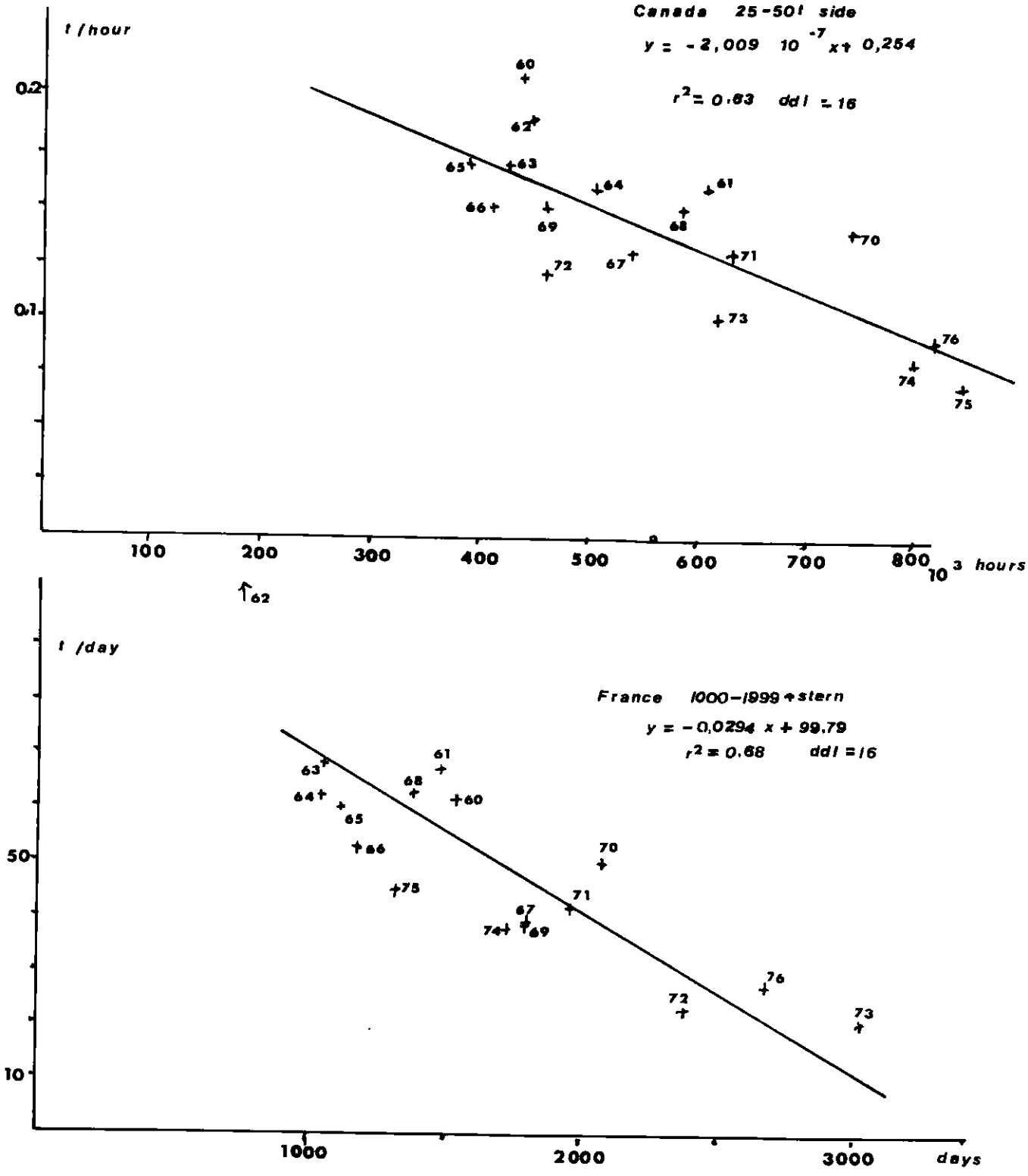

Fig. 2. Regression of the effort and the CPUE for the two standard units: canadian and french trawlers.

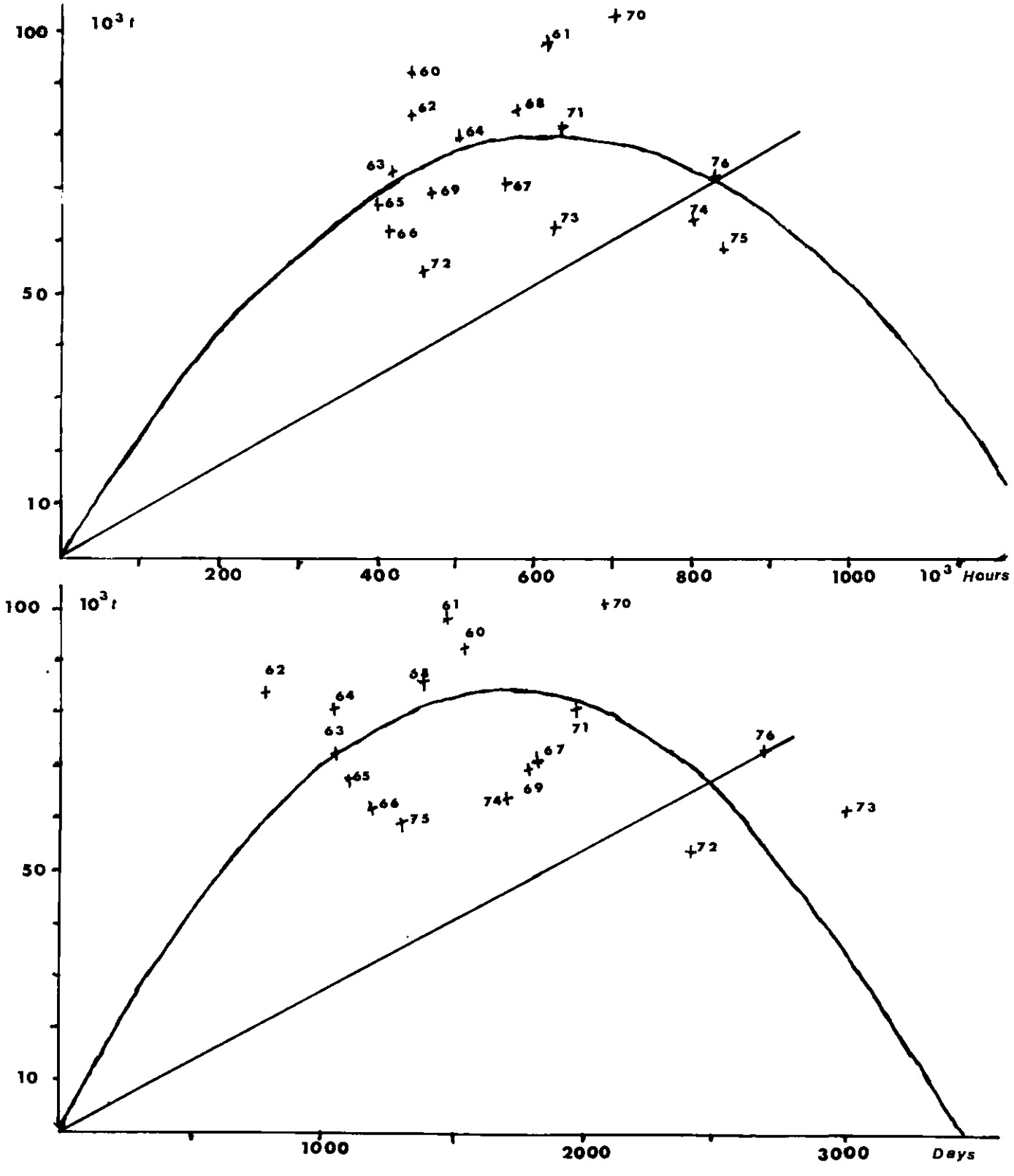

Fig. 3. Production model curves for the two standard units.

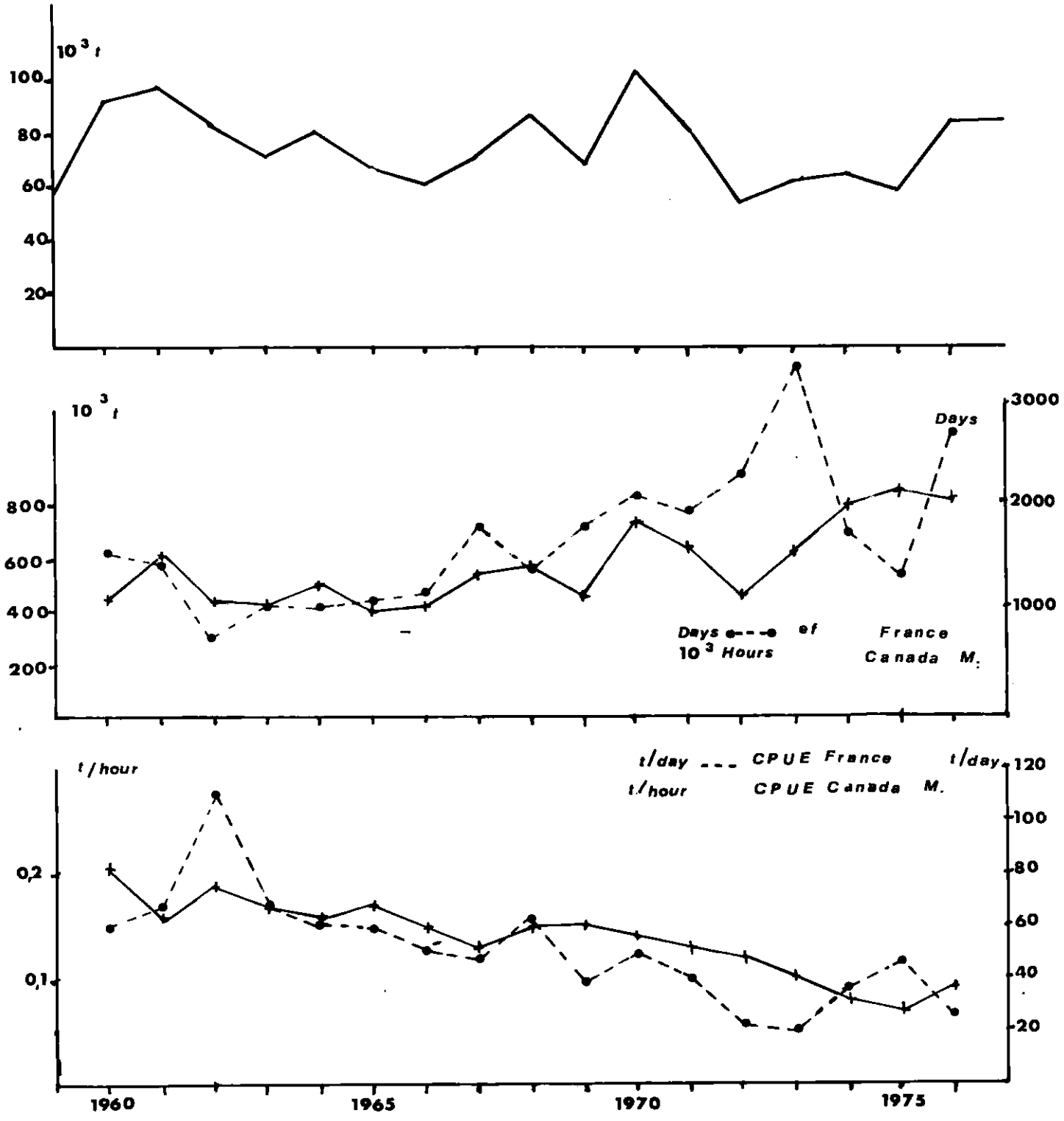

Fig. 4. Catches, effort and CPUE for the 4 RS - 3 Pn cod stock between 1960 and 1976.