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The Rate of Growth of Cod on the Fishing Grounds
Off Labrador and Newfoundland, 1964 and 1965

by:

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The material for this paper was collected during research cruises of R/V Wieczno in two periods: June-July 1964 (Div. 2J and 3K) and April-May 1965 (Div. 3L, 3M, 3O and 3P). The number of fish analysed for growth rate and grouped according to ICNAF Divisions was as follows:

<u>Divisions</u>	<u>2J</u>	<u>3K</u>	<u>3L</u>	<u>3M</u>	<u>3O</u>	<u>3P</u>
Number of fish examined	670	745	1163	277	635	481

Direct age readings and the mean lengths of fish of particular age groups formed the basis for calculation of rate of growth. The age was read from otoliths. The von Bertalanffy equation was used, in accordance with the method of data analysis given by Beverton and Holt (1957) and by Ricker (1958), for computation of the rate of growth of cod in the above ICNAF Divisions. This equation:

$$L_t = L_\infty [1 - e^{-K(t - t_0)}]$$

where:

L_t = fish length at age t
 L_∞ = asymptote of curve of growth in length
 K = coefficient constant
 t_0 = arbitrary origin of growth curve

makes it possible to examine differences in the rate of growth of cod in particular Divisions and to compare them with results obtained by other authors (Beverton, 1964; May, et al, 1964; May, 1966). The parameters of the rate of growth (L_∞ , K and t_0) are presented in Table I.

Table I The growth parameters for cod

Parameters	1964, June-July		1965, April-May			
	2J	3K	3L	3M	3O	3P
L_∞	96.6	104.4	142.8	79.2	115.0	79.6
K	0.100	0.100	0.100	0.197	0.117	0.253
t_0	-0.6	-0.3	0.2	0.3	0	0.7

These parameters were used to calculate the rates of growth in each Division (Table II and Fig. 1).

It must be pointed out that the growth rate for the youngest and oldest age-groups was calculated on the basis of empirical data derived from the groups of higher frequency of occurrence. The empirical data for the oldest groups show considerable differences possibly due to the small numbers of fish examined.

Cod in Div. 2J

The growth rate of cod on the fishing grounds off Southern Labrador (Div. 2J) is faster in its initial period of life ($t_1 = 14.3$ cm; $t_2 = 22.1$ cm) than it is in

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other Divisions. Beginning with age-group 3, the growth rate decreases and continues at the lowest level ($t_6 = 46.7$ cm; $t_{12} = 69.2$ cm) of growth recorded for all Divisions.

Table II The values of growth rate of cod in ICNAF Divisions

Age	1964, June-July		1965, April-May			
	2J	3K	3L	3M	3O	3P
1	14.3	12.7	9.6	10.3	13.0	5.4
2	22.1	21.4	20.4	22.3	23.7	22.4
3	29.5	29.3	30.6	32.6	33.9	35.0
4	35.6	36.5	39.7	40.6	43.1	44.9
5	41.4	42.9	47.8	47.6	50.6	52.8
6	46.7	48.8	55.2	53.3	58.0	58.8
7	51.4	54.1	61.9	58.0	64.4	63.4
8	55.7	58.9	68.0	61.9	70.0	67.1
9	59.6	63.2	73.4	64.9	74.7	69.8
10	63.1	67.1	78.4	67.5	79.3	72.0
11	66.3	70.7	82.9	69.6	83.4	73.7
12	69.2	73.9	86.9	71.2	86.7	75.0

Cod in Div. 3K

The rate of growth of cod occurring in the Northeastern shelf off Newfoundland (Div. 3K) is also rather good in the initial period of life ($t_1 = 12.7$; $t_2 = 21.4$ cm). In subsequent years it drops considerably ($t_6 = 48.8$ cm; $t_{12} = 73.9$ cm) but remains at a higher level than that attained by cod in Div. 2J.

Cod in Div. 3L

On the fishing grounds of the Great Bank of Newfoundland (Div. 3L) the growth rate to age-group 5 remains within average values. In older age-groups the rate of growth is evidently increased, reaching the highest value in age-group 12 ($t_{12} = 86.9$ cm).

Cod on Flemish Cap (Div. 3M)

The growth curve bends more sharply for the cod in Flemish Cap (Div. 3M) and shows that at first the length increments remain within average values ($t_1 = 10.3$ cm; $t_2 = 22.3$ cm; $t_6 = 53.3$ cm) but later decreases so much that the length of cod in age-group 12 is below average size ($t_{12} = 71.2$ cm).

Cod in Div. 3O

Cod on the south-western part of the Great Bank of Newfoundland (Div. 3O) is characterized by particularly fast growth, (Table II and Fig. 1).

Cod in Div. 3P

The growth rate curve for cod on St. Pierre Bank (Div. 3P) is similar to that for cod on Flemish Cap, though it represents different values. The slowest rate of growth is in age-group 1 ($t_1 = 5.4$ cm), but subsequently it increases to age-group 6 ($t_2 = 22.4$ cm; $t_6 = 58.8$ cm). Beginning with age-group 7 the growth of cod becomes slower ($t_{12} = 75.0$ cm).

The tabular data and graphic representation show that cod in Div. 2J and in Subarea 3 have different growth rates. In general, the slowest rate of growth is recorded for cod in Div. 2J and the fastest in the southern part of the Great Bank of Newfoundland (Div. 3L) and in the southwestern part of this Bank (Div. 3O). Cod on other fishing grounds, as in Div. 3K, 3M and 3P, are characterized by intermediate rate of growth. Some cod (Div. 3P) have a high rate of growth in the early years of life, though later on the rate decreases.

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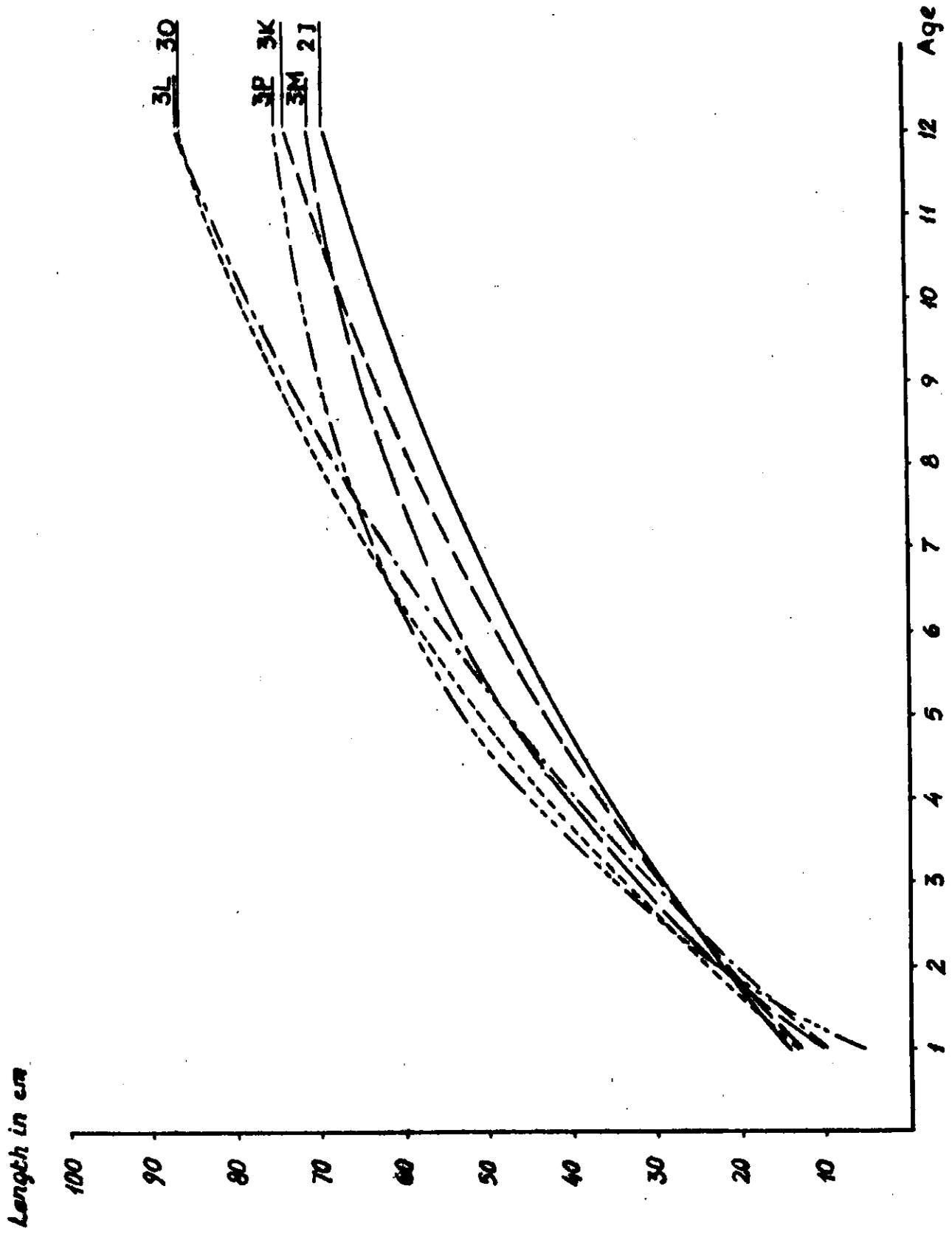


Fig. 1 The rate of growth of cod in ICNAF Divisions.