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Results for yellowtail flounder from USSR surveys in Divisions 3LNO

by

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Introduction

This paper presents the results of USSR spring-summer surveys in Div. 3LNO. Bowering and Chumakov (1990) presented the data for yellowtail flounder from these surveys for the period 1972-89 and this paper adds the data from the 1990 survey, as well as age compositions for yellowtail for some years. In recent years, there have been problems with catch statistics and lack of sampling data from some non-member countries fishing for yellowtail in the NAFO Regulatory Area. This has led to increased emphasis being placed on the results of research vessel surveys in determining stock status. The purpose of this paper is to provide additional survey data for consideration in the assessment of the yellowtail stock in Div. 3LNO.

Materials and Methods

The USSR has conducted groundfish surveys in NAFO Div. 3KLMNO in the spring-summer period of each year since 1972. Exact information on how these surveys were conducted can be found in Bulatova and Chumakov (1986) and has been recently reviewed by a working group of NAFO (Anon, 1990). The method outlined in Bowering and Chumakov (1990) was followed for the analyses, adding the 1990 data to the time series. All strata inside the 50 fath contour were chosen for the analyses, as few non-zero catches were recorded outside this area (Fig. 1). Multiplicative models, using year and stratum effects, were employed to determine estimates of abundance and biomass for strata not fished in a year. Six analyses were conducted, one each for abundance and biomass in each of Divs. 3L, 3N, and 3O.

To determine age compositions of the surveyed yellowtail population, length frequencies collected on the USSR surveys were examined. Age-length keys from Canadian surveys conducted at about the same time as the USSR surveys each year were used to derive values of abundance at age from the length frequency data and the total abundance from the multiplicative models. Length frequency data for yellowtail were available for the years 1984-85 and 1987-90.

Results and Discussion

Survey coverage was generally consistent from year to year (Bowering and Chumakov, 1990), resulting in few missing values to be estimated by the models. There were no data available for 1983. In Div. 3L, which contains only a small part of the total 3LNO stock, estimates of abundance (Fig. 2) and biomass (Fig. 3) showed considerable variability from 1972-84, then declined sharply in 1985 and remained at a very low level in recent years.

In Div. 3N, where most of the population is found, the abundance (Fig. 4) and biomass (Fig. 5) were relatively at high levels until 1985, then declined to lower levels in 1986-88. The 1989 estimates were somewhat higher, but declined in 1990, to their lowest levels in the time series.

In Div. 3O, the abundance (Fig. 6) and biomass (Fig. 7) estimates were variable but showed no discernable trend up to 1984, declined in 1985, then declined further to the lowest levels in the series in 1987-89. The values for 1990 increased somewhat, to around the values observed in 1985-86.

Figures 8 and 9 show the trends in abundance and biomass respectively for Div. 3LNO combined. Both show the declines in stock size from a relatively high level in the 1970's and

early 1980's to values in the late 1980's which are well below any others in the series. These trends are identical to those in the Canadian surveys, which showed a sharp drop in abundance in 1985, a continued decline to 1988, and a slight increase thereafter (Fig. 10). Both series indicate present stock size to be well below historic levels.

The abundance at age for Div. 3LNO combined is shown in Table 1 for the years 1984-85 and 1987-90 and is plotted in Fig. 11. As in the Canadian groundfish surveys, age 7 dominates the USSR survey catches, and few yellowtail at ages 1-3 are present. This suggests that the survey gear used in the USSR series has a selectivity for yellowtail similar to that of the Canadian survey gear. However, there is considerable variability in year-class sizes along cohorts in the USSR surveys, e.g. the 1982 year-class, and the 1985 year-class at ages 3, 4, 5. This year-class has been identified from Canadian groundfish and juvenile flatfish surveys as being larger than the preceding few year-classes. The USSR surveys show it to be strong at age 4, but very weak at ages 3 and 5. Such variability can sometimes be seen for certain year-classes in the Canadian survey results, particularly at younger ages.

References

Anon, 1990. Final report of the STACREC working group on survey design and procedures. NAFO SCS Doc. 90/20, Ser. No. N1816, 81 p.

Bovering, W. R., and A. K. Chumakov. 1990. Trends in biomass and abundance estimates of yellowtail flounder (Limanda ferruginea) from USSR surveys in Div. 3LNO. NAFO SCR Doc. 90/70, Ser. No. N1792, 11 p.

Bulatova, A. Yu., and A. K. Chumakov. 1986. USSR travl surveys in NAFO Subareas 0, 2, 3. NAFO SCR Doc. 86/66, Ser. No. N1183, 13 p.

Table 1. Abundance (millions) of yellowtail at age as estimated from USSR surveys in Div. 3LNO. Data for 1986 are missing.

AGE	1984	1985	1986	1987	1988	1989	1990
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.1	0.0	0.1	0.0	0.3	0.0
3	0.2	3.2	0.0	0.5	0.0	5.9	0.3
4	4.2	9.6	0.0	1.2	0.6	23.0	1.9
5	26.7	18.6	0.0	6.8	1.2	17.3	3.6
6	92.7	54.3	0.0	17.5	5.4	20.2	6.9
7	120.3	66.5	0.0	27.9	20.5	39.7	24.4
8	48.3	25.6	0.0	15.2	19.1	17.2	20.2
9	3.0	1.9	0.0	1.7	2.0	2.0	2.4
10	0.0	0.5	0.0	0.3	0.2	0.2	0.1
1+	295.5	180.3	0.0	71.1	48.9	125.7	59.8
2+	295.5	180.3	0.0	71.1	48.9	125.7	59.8
3+	295.5	180.2	0.0	71.0	48.9	125.4	59.8
4+	295.3	177.0	0.0	70.5	48.9	119.5	59.5
5+	291.1	167.4	0.0	69.3	48.3	96.5	57.6
6+	264.4	148.8	0.0	62.6	47.1	79.3	54.0
7+	171.7	94.5	0.0	45.1	41.7	59.1	47.1
8+	51.3	28.0	0.0	17.2	21.2	19.4	22.7
9+	3.0	2.4	0.0	2.0	2.2	2.2	2.5

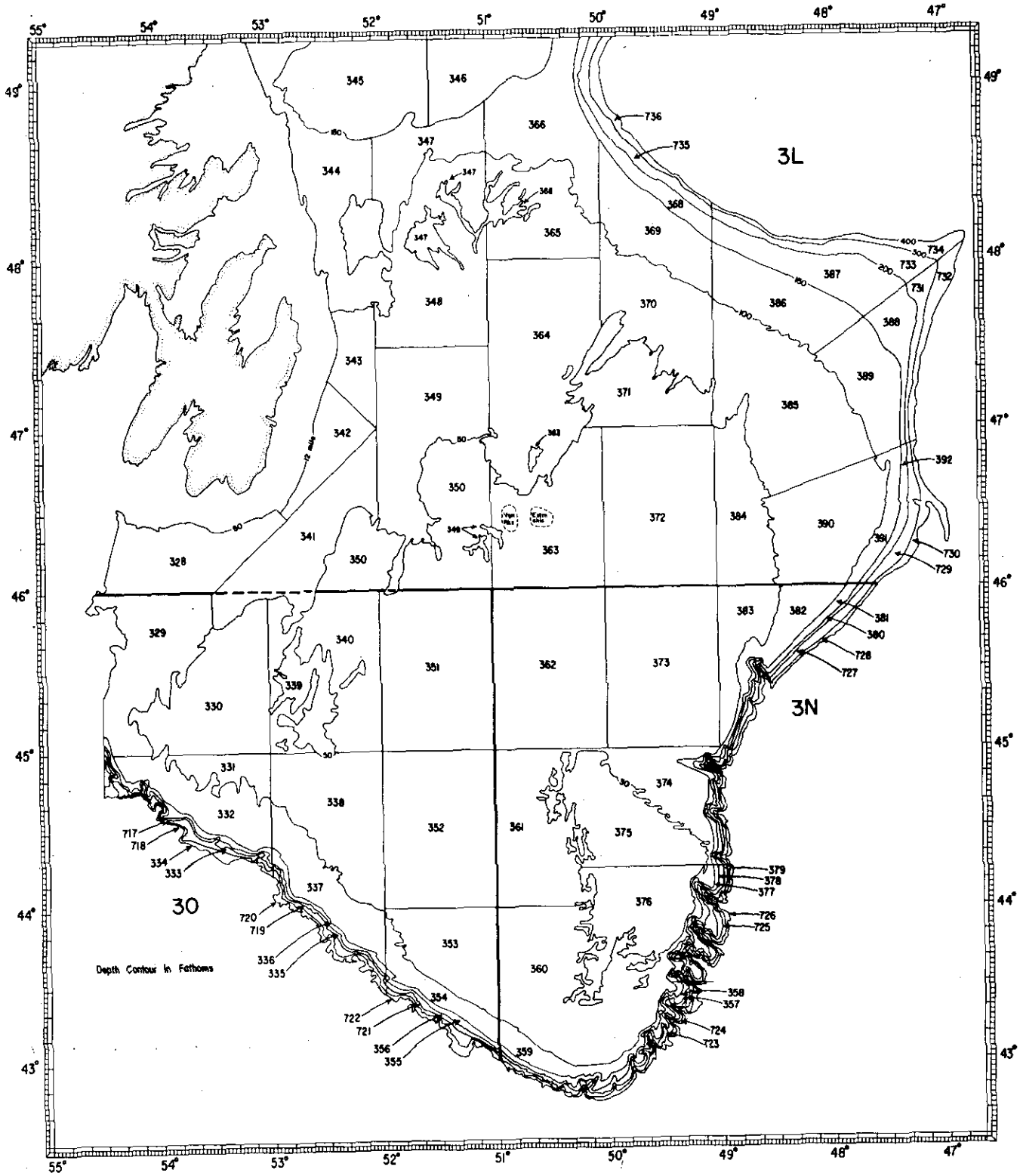

Fig. 1. Stratification scheme used for stratified random surveys in NAFO Div. 3LNO.

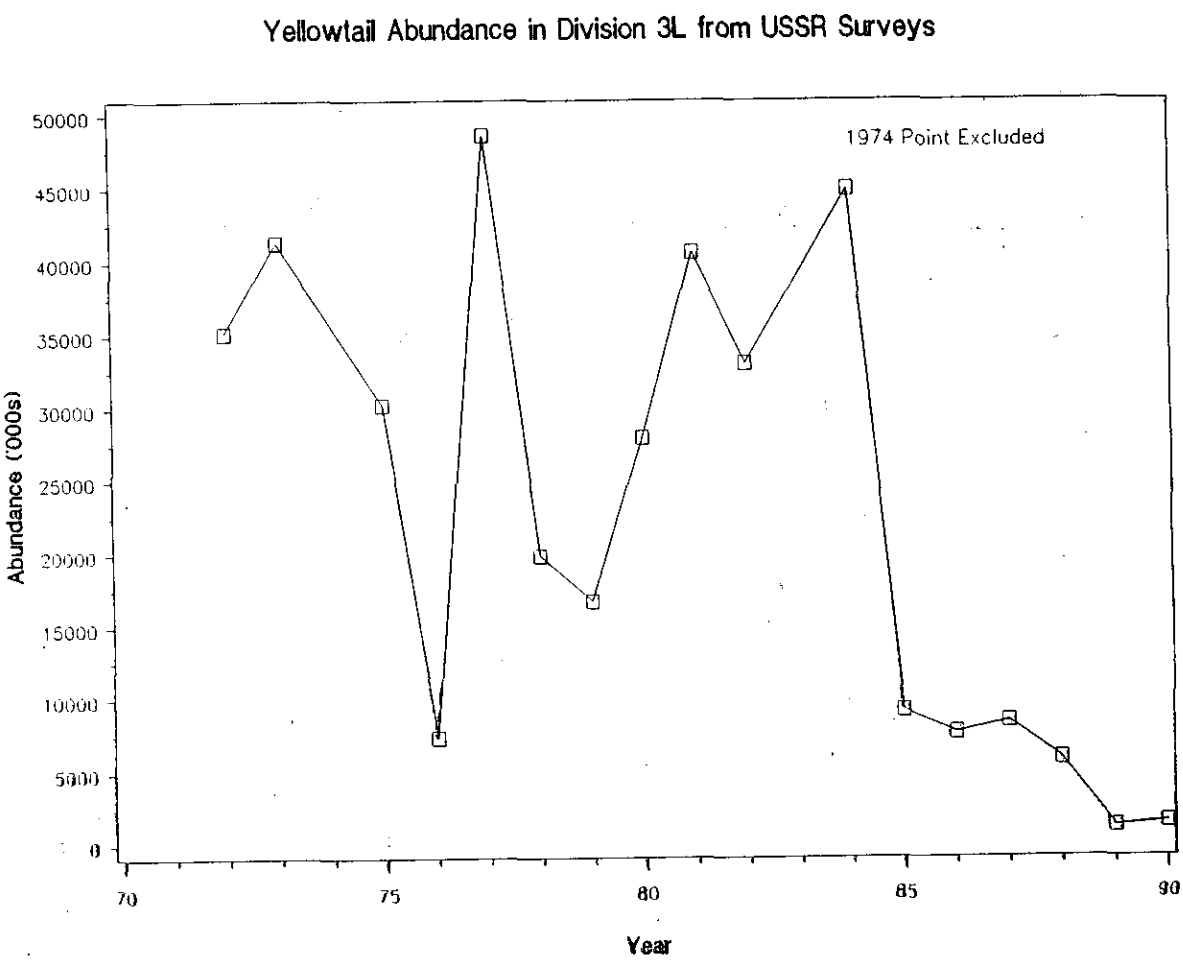

Fig. 2. Abundance of yellowtail in Div. 3L, from USSR surveys.

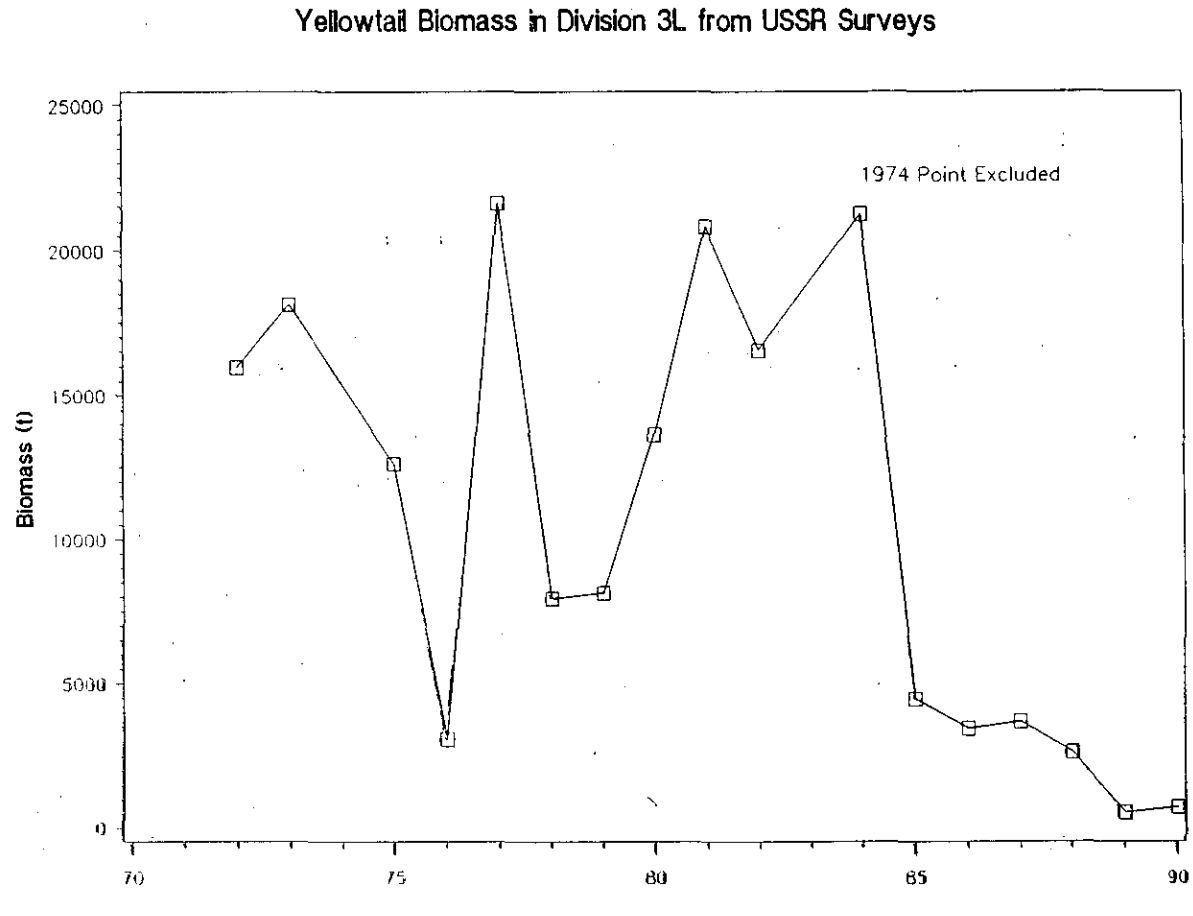

Fig. 3. Biomass of yellowtail in Div. 3L, from USSR surveys.

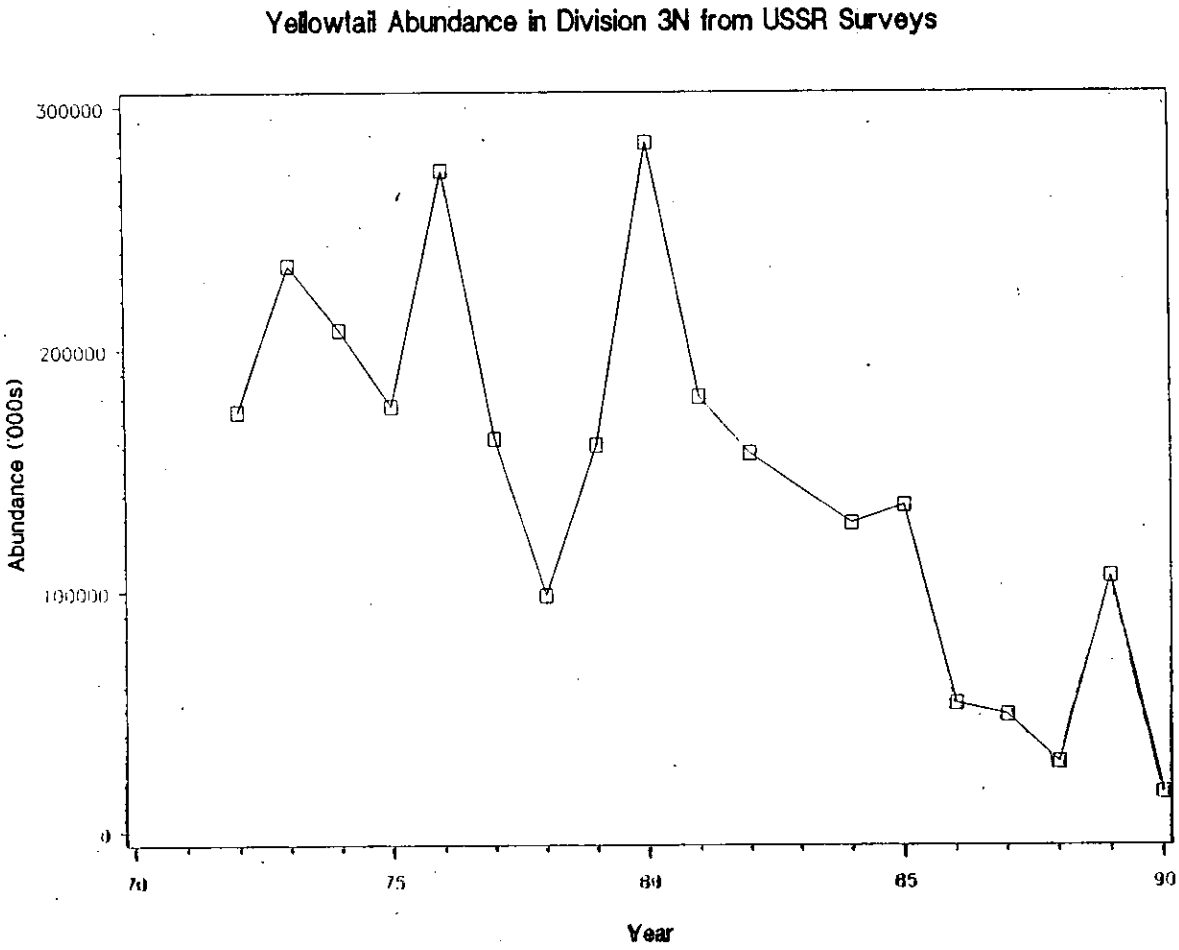

Fig. 4. Abundance of yellowtail in Div. 3N, from USSR surveys.

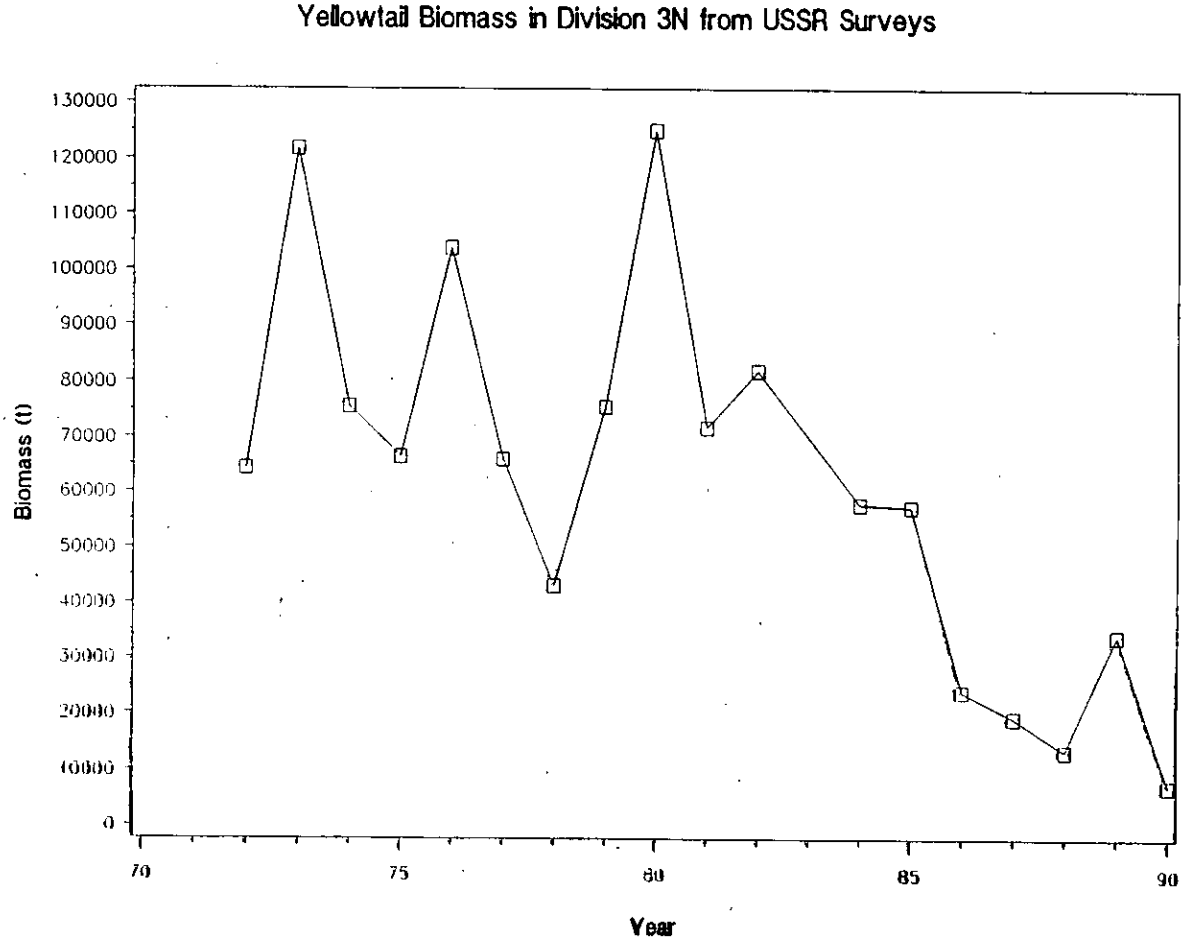

Fig. 5. Biomass of yellowtail in Div. 3N, from USSR surveys.

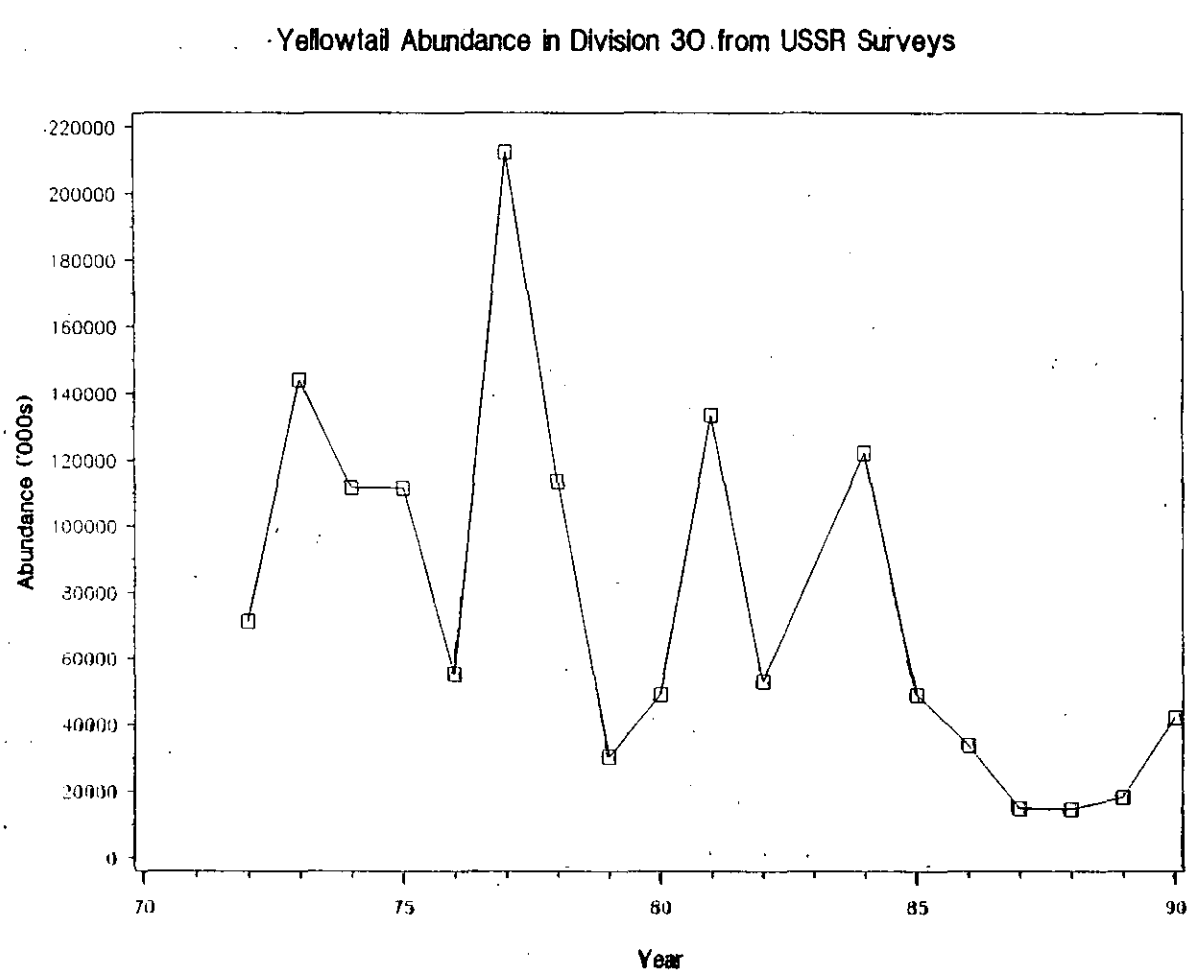

Fig. 6. Abundance of yellowtail in Div. 3O, from USSR surveys.

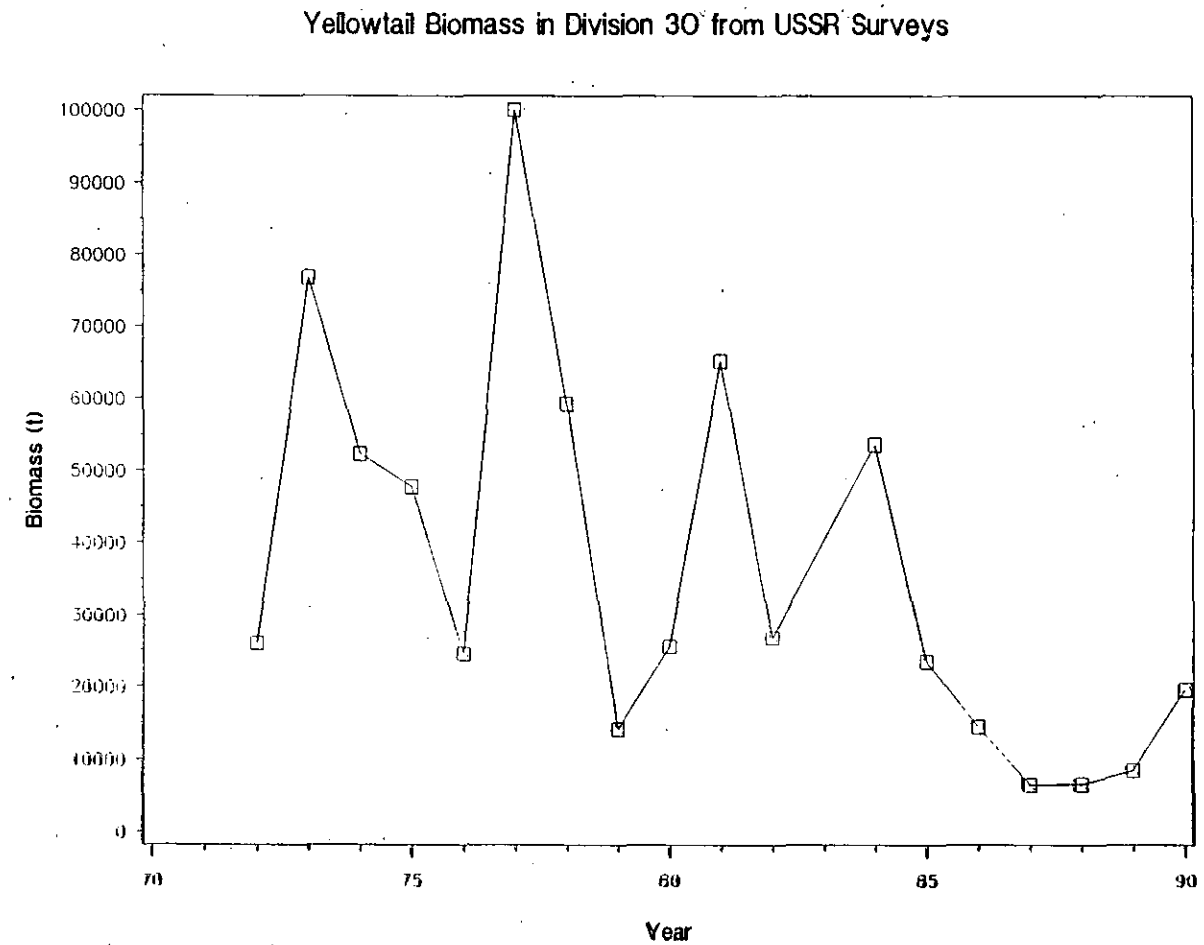

Fig. 7. Biomass of yellowtail in Div. 3O, from USSR surveys.

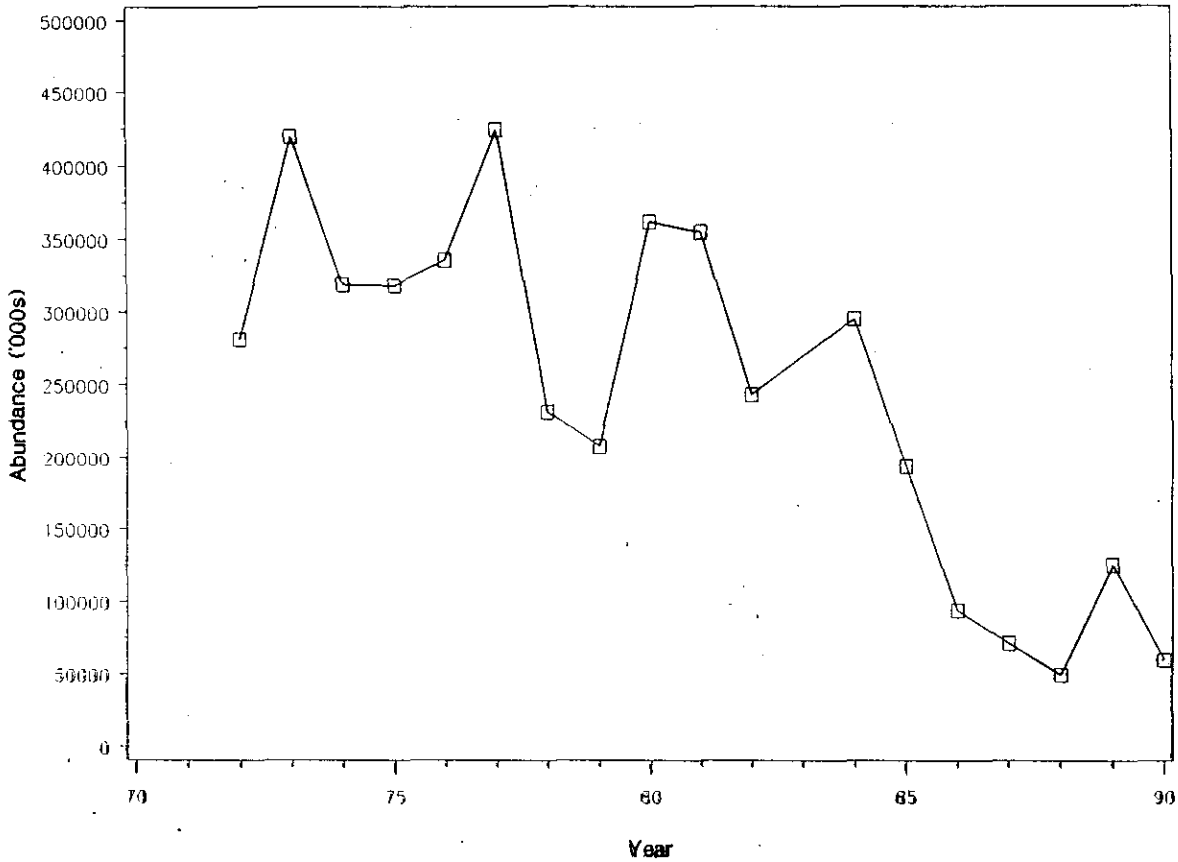

Figure 8 Yellowtail Abundance in Division 3LNO from USSR Surveys

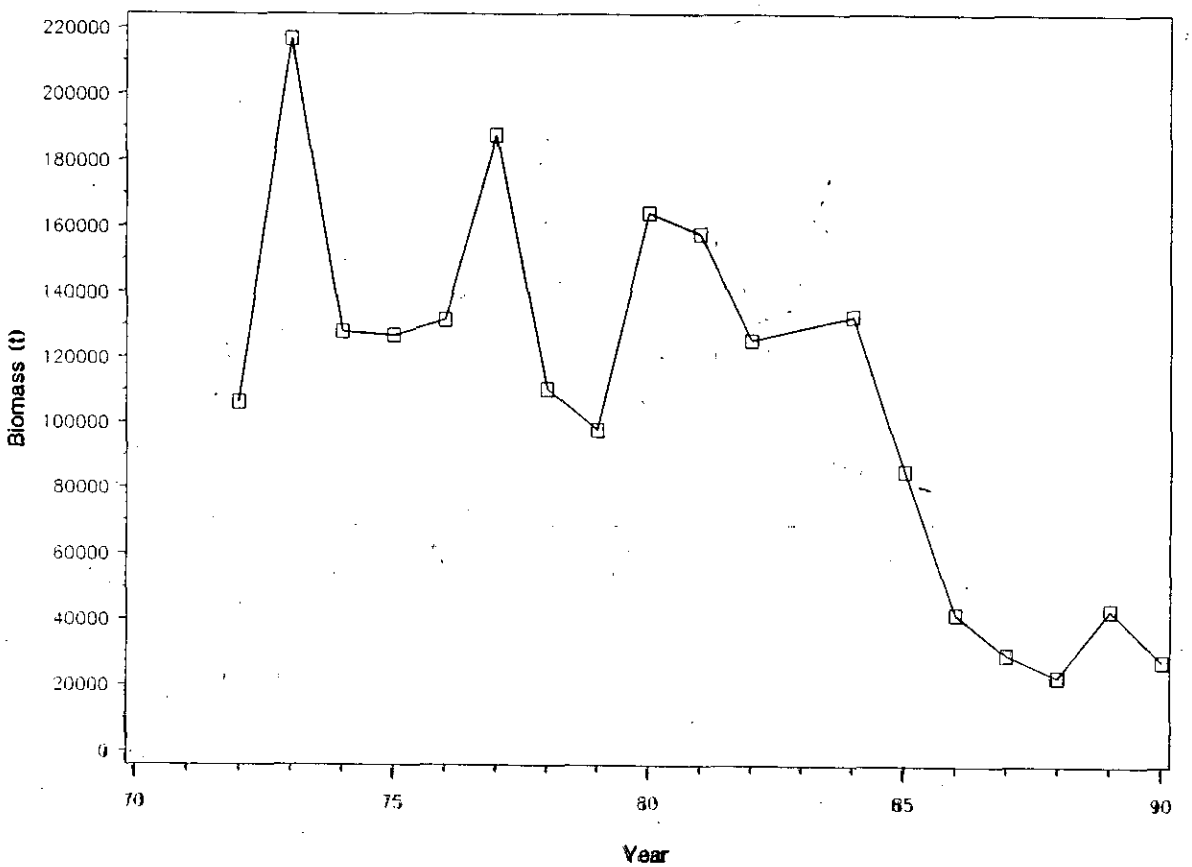

Figure 9 Yellowtail Biomass in Division 3LNO from USSR Surveys

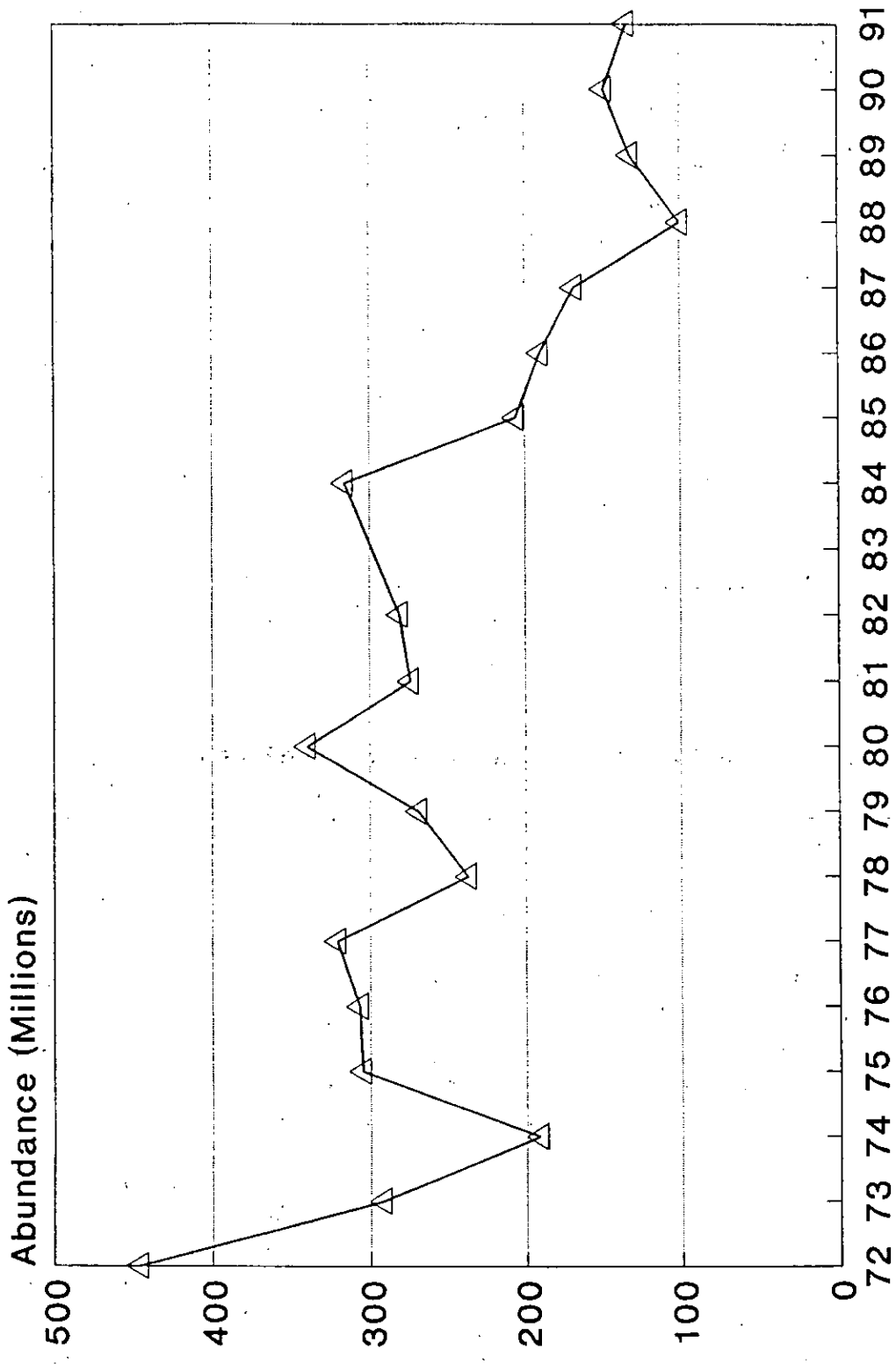

Figure 10 Age 1+ abundance of Yellowtail from Canadian spring RV in Div 3LNO.

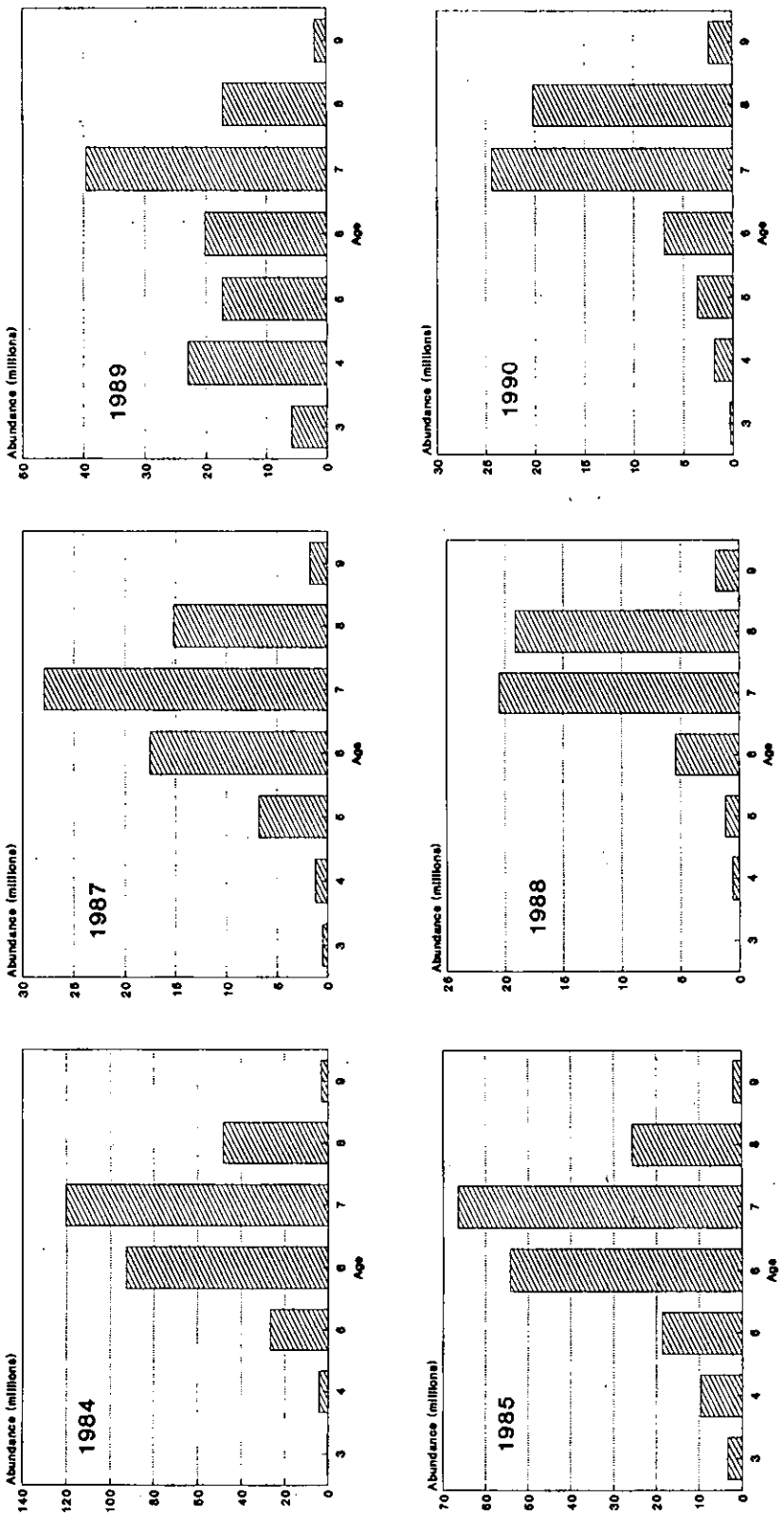

Figure 11. Age compositions of Yellowtail derived from surveys conducted by the USSR in Div. 3LNO.