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Outline of Japanese Capelin Fishery in Div. 3NO and
Some Biological Data of Capelin in 1990

by

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INTRODUCTION

The Japanese directed trawl fishery for capelin in the ICNAF/NAFO waters started in 1975, though the fishery in Div. 3NO had been closed during 1979-86 due to the depression of capelin stock. The capelin fishery started again in 1987 and Japan has been one of the countries which have caught capelin in Div. 3NO. TAC of capelin in Div. 3NO was 30,000 tons and Japan caught about 2,000 tons in 1990. In this document, some information on directed catch, effort and CPUE of Japanese capelin fishery and some biological data on capelin are presented.

MATERIAL AND METHODS

Catch and effort data of Japanese trawlers were collected from 1975 to 1990. CPUE were calculated from the monthly directed catch and effort data regardless of tonnage classes.

Two frozen samples (each one was 10kg) were collected from the capelin catch of a Japanese trawler (3,000 GRT class stern trawler) operated in Div. 3N. One was taken on 29th June 1990 (44° 14' N, 49° 48' W) and the other was on 6th July 1990 (43° 54' N, 50° 04' W). These samples were collected randomly from the catch of a mid water trawl haul. The mesh size of cod-end used was about 20 mm. Total of 167 specimens were collected from the sample of 29th June randomly and 267 from 6th July as length compositions data. For age-length key, otoliths of 10-20 specimens were collected in each 1cm class interval by sex. Age determination by otoliths was followed Templeman (1948). The maturity stage of females used in age determination were determined with the naked eye. There were some deferences in the sex ratio and the maturity between the samples. But it was not clear whether these deferences were significant or not, because the number of samples were insufficient. Therefore, the data were combined here.

RESULT

Japanese capelin fishery

Japanese directed trawl fishery for capelin (Japanese capelin fishery) started in 1975. The Japanese catch of capelin increased abruptly from 2,800 tons in 1975 to 5,100 tons in 1976, but declined rapidly to 800 tons in 1978 (Table 1). During this period, more than 70 % of the catch were

taken from Div. 3NO. In 1977 and 1978, Japan also caught 870 tons and 70 tons of capelin on northern stock area (Subarea 2 + div. 3K) in the autumn. The capelin fishery in Div. 3NO had been closed during 1979-86 due to the depression of capelin stock. In 1987, 10,000 tons of TAC was allocated in Div. 3NO, because the stock has recovered. Japan resumed the capelin fishery and caught 800 tons in 1987. Japanese catch increased to 2,200 tons in 1989 but declined slightly to 2,100 tons in 1990. The Japanese fishery occurred only on Div. 3N during 1987-90.

Monthly effort, catch and CPUE of Japanese capelin fishery in Div. 3NO were shown in Table 2. The CPUE declined from 4.75 tons/hour in 1975 to 0.23 in 1978. The CPUE increased gradually from 2.68 tons/hour in 1987 to 6.48 in 1989 but slightly declined to 4.95 in 1990. Most of Japanese capelin fishery in Div. 3NO was operated during June and July.

After 1987, the fishing ground of Japanese capelin fishery has been restricted in the shallow waters out of the 200 miles limit in Div. 3N in comparison with the large fishing ground during 1975-78 (Fig. 1). The fishing season in 1990 was about one month from 10th June to 9th July (Table 2). The trawlers operated capelin fishery were one 3,000 and two 300 GRT class stern trawlers. Almost of all catch (97 %) was taken by a 3,000 GRT class stern trawler. Capelin were caught at the depth of 45-60 m by mid-water trawls. The catch increased from 300 tons in mid-June to 890 in late June but slightly declined to 860 in early July. The CPUE increased from 1.39 tons/hour in mid-June to 7.22 in late June, and up to 11.51 in early July. Although the CPUE was still high in early July, Japanese trawlers stopped their operations by the reason that most of the catch became to be male.

Biological data

Length compositions of capelin by sex were shown in Table 3. The specimens ranged from 13.5-18.5 cm in male and 12.5-17.0 cm in female. Two indistinct modes were observed in both sexes. The modes in male were 0.5-1 cm larger than those in female.

Total of 60 specimens in male and 69 in female were aged. These specimens ranged from 2 years old to 4 years old and 3 years old specimens were dominant in both sexes. Age-length key by sex based on the ageing result were shown in Table 4. This age-length key was preliminary due to insufficient number of specimens. The size range of 2 years old specimens was very wide and the number of specimens of 4 years old was few in both sexes.

Age compositions were tentatively estimated in both sexes using the preliminary age-length key (Table 5). 3 years old fish (1987 year class) was dominant, accounting for 61 % in male and 72 % in female. 2 years old fish (1988 year class) accounted for 9 % in male and 14 % in female. This pattern of age composition was similar to that of Soviet commercial catch in Div. 3NO in 1988 (Miller and Carscadden, 1990).

Maturities of female by age were shown in Table 5. Almost all of the specimens were matured or spent. The percent of matured specimens declined from 77 % in 2 years to 70 % in 4 years gradually. The percent of spent specimens increased from 23 % in 2 years to 30 % in 4 years opposite to that of matured specimens.

REFERENCES

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- MILLER, D. S., and J. E. CARSCADDEN. 1990. A biomass estimate from a hydro-acoustic survey for capelin (*Mallotus villosus*) in NAFO division 3N and observations on the Soviet fishery for capelin in divisions 3NO. *NAFO SCR Doc.*, 90/61: 5 p.

Table 1. Capelin catch in tons by Japanese trawlers in Subareas 2 and 3 in 1975-1990.

	1975	1976	1977	1978	*	1987	1988	1989	1990
2J	-	19	565	0		-	-	-	-
3K	-	32	306	69		-	-	-	-
3L	85	27	212	123		-	-	-	-
3N	2,248	3,032	3,704	616		793	1,395	2,222	2,054
3O	486	1,973	41	3		-	-	-	-
3P	-	29	-	-		-	-	-	-
Total	2,819	5,111	4,828	818		793	1,395	2,222	2,054

* : The fishery of capelin in Div. 3LNO was closed during 1979-86.

Table 2. Monthly effort, catch and CPUE of Japanese direct trawl fishery for capelin in Div. 3NO 1975-1990.

EFFORT(hour)

	MAY	JUN.	JUL.	AUG.	Total
1975	-	485	90	-	575
1976	370	4,056	1,322	-	5,747
1977	-	2,483	217	-	2,700
1978	-	2,365	304	-	2,669
*					
1987	-	285	11	-	296
1988	15	345	82	-	442
1989	31	275	11	25	342
1990	-	341	75	-	415

CATCH(ton)

	MAY	JUN.	JUL.	AUG.	Total
1975	-	2,018	626	-	2,734
1976	396	3,264	1,345	-	5,005
1977	-	3,398	348	-	3,746
1978	-	613	7	-	620
*					
1987	-	756	37	-	793
1988	22	1,220	153	-	1,395
1989	30	2,066	111	15	2,222
1990	-	1,191	863	-	2,054

CPUE(ton/hour)

	MAY	JUN.	JUL.	AUG.	Total
1975	-	4.35	6.96	-	4.75
1976	1.07	0.80	1.02	-	0.87
1977	-	1.37	1.60	-	1.39
1978	-	0.26	0.02	-	0.23
*					
1987	-	2.65	3.36	-	2.68
1988	1.47	3.54	1.87	-	3.17
1989	0.97	7.51	1.21	0.40	6.48
1990	-	3.49	11.51	-	4.95

* : The fishery of capelin in Div. 3NO was closed during 1979-86.

Table 3. Length composition of capelin caught by a Japanese trawler in div. 3N in June-July 1990. Numerals show the number of specimens measured.

Fork Length (cm)	male	female
12.5		6
13.0		21
13.5	1	31
14.0	5	36
14.5	28	30
15.0	34	37
15.5	29	17
16.0	35	23
16.5	35	9
17.0	29	1
17.5	21	
18.0	4	
18.5	1	
Total	222	211

Table 4. Preliminary age-length key of capelin by sex caught by a Japanese trawler in Div. 3N in June-July 1990. Numerals show the number of specimens observed.

Fork Length (cm)	Age					
	Male			female		
	2	3	4	2	3	4
11				1		
12				7		
13	2			7	12	4
14	7	7	1	2	15	1
15	1	15			11	6
16	9	10		3		
17	4	3				
18	1					

Table 5. Age composition (%) of capelin caught by a Japanese trawler in Div. 3N in June-July 1990.

Sex	Age Composition (%)		
	2	3	4
Male	9.1	61.4	29.5
Female	13.9	71.0	15.1
Total	11.4	66.1	22.5

Table 6. Maturity (%) of female capelin caught by a Japanese trawler in Div. 3N in June-July 1990.

Maturity (%)	Age			Total
	2	3	4	
Inmature	-	2.5	-	1.8
Matured	76.6	72.6	70.1	72.7
Spent	23.4	24.9	29.9	25.5

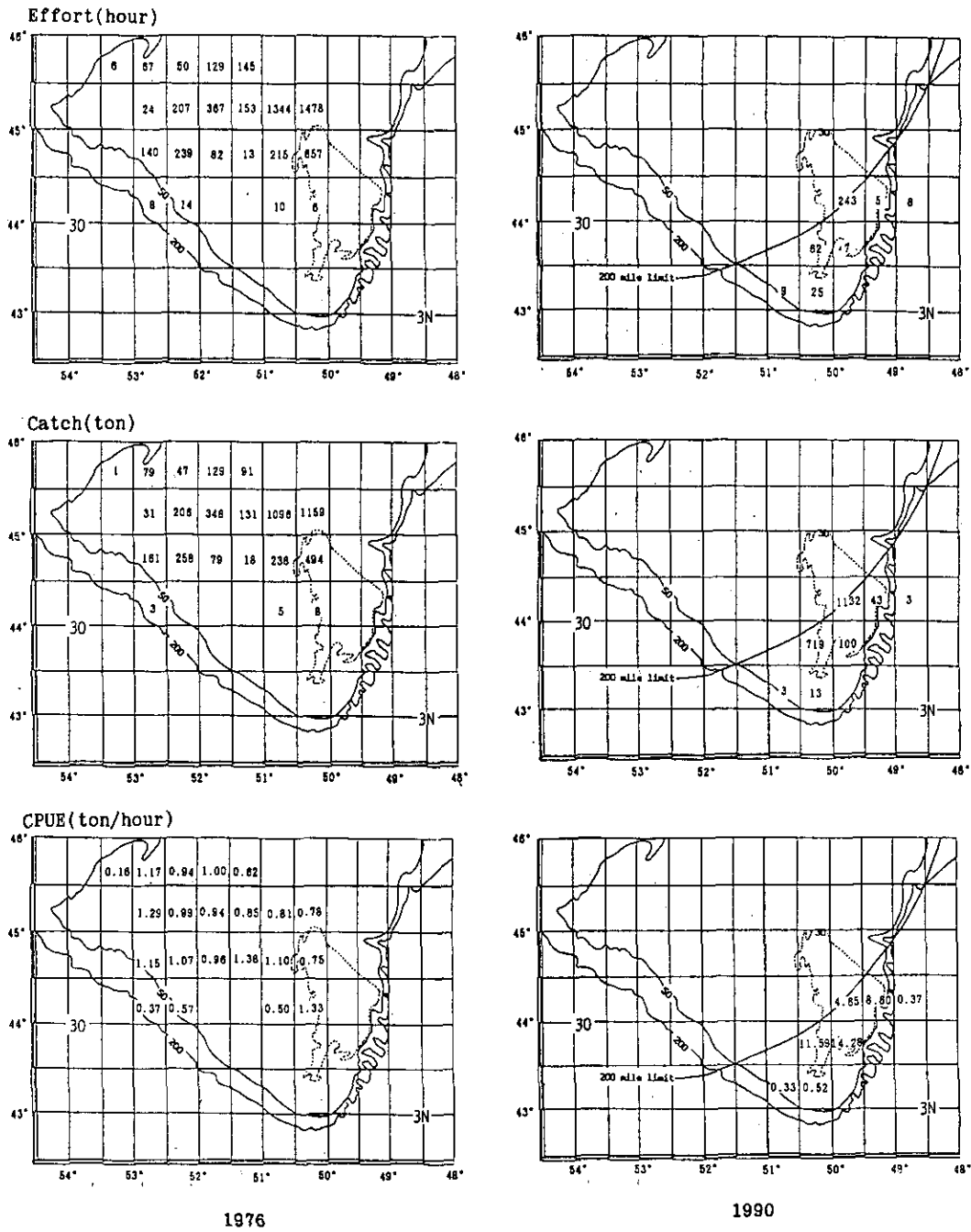


Fig. 1. Distribution of effort(hour), catch(ton) and CPUE(ton/hour) of Japanese direct trawl fishery for capelin in Div. 3NO in June-July 1976 and 1990.