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Japanese Research Report for 1978

by

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The total catch taken by Japanese trawl fisheries in the Northwest Atlantic (Subarea 3 to 5 and Statistical Area 6) showed a substantial decrease from 25,000 tons in 1977 to 13,200 tons in 1978, together with the reduction of corresponding fishing effort from 38,400 hours to 25,100 hours. This change in catch was caused mainly by a sharp drop in the catches of caplin in Canadian waters and Loligo squid in American waters, and the resulting total catch in 1978 was the lowest of any of the past ten years (Table 1).

Four different types of trawl fishery, i.e., caplin, Illex, joint Illex-argentine and joint Loligo-butterfish fisheries, were carried out by Japanese trawlers in 1978. In case of the caplin fisheries, all of the vessels operated using the special mid-water trawl gear with the fine cod-end mesh of 14-40 mm (mostly 16-18 mm), while most of the vessels engaged in the other fisheries employed either of the bottom or off-bottom trawl gears with the larger cod-end mesh of 45-90 mm (mostly 45-60 mm). In the latter case, the choice of gear depended upon such fishing conditions as the roughness of sea-bottom, the amount and/or the height of concentrations of target species and the presence of by-catch species.

The provisional Japanese catches and fishing effort by Division for 1978 are shown in Table 2. Of Japanese catches by species, the catch of Illex was overwhelmingly large, followed by Loligo squid, accounted for 55 % and 17 % of the total catch from the ICNAF waters, respectively.

The outlines of Japanese trawl fisheries in each Subareas concerned and in Statistical Area 6 in 1978 and related research activities are as follows,

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1. SUBAREA 3 (Div.3LNO)

A. Status of the Fisheries

The caplin and the Illex fisheries were carried out from June to July and from June to November, respectively. The total catch taken by these fisheries decreased from 4,500 tons in 1977 to 1,400 tons in 1978 (Table 2). This change was caused mainly by a sharp drop in caplin catch from Div.3N, but the combined catch of Illex and caplin accounted for around 95 % of the total catch from this Subarea.

As for the caplin fishery, the amount of fishing effort expended in the main fishing grounds and the fishing pattern were nearly the same as those in the previous year, but the catch of caplin remained at merely 800 tons accounting for 17 % of that in 1977 and only 9 % of the Japanese quota for 1978. The majority of caplin catch was taken in June from the Southeast Shoal where no attractive concentration of the fish was observed. Because of the abnormally poor fishing like this, the Japanese fleet the fishing grounds in July and moved to Subarea 4 for the joint Illex-argentine fishery (refer to ICNAF Res.Doc.79/II/23).

A small-scale Illex fishery was made mainly in June in Div.3O, and 550 tons of Illex were taken on and along the southwestern edge of the Grand Bank (refer to ICNAF Res.Doc.79/II/22).

2. SUBAREA 4 (Div.4VWX)

A. Status of the Fisheries

The joint Illex-argentine fishery was carried out from July to November on and along the southern edge of the Scotian Shelf. The total catch from this Subarea increased slightly from 5,300 tons in 1977 to 5,600 tons in 1978, while the corresponding total fishing effort slightly decreased from 5,500 hours to 5,200 hours (Table 2).

The catches of Illex and argentine accounted for 70 % (3,900 tons) and 26 % (1,500 tons) of the total catch, respectively. Around 66 % of the Illex catch were taken from the southeastern edge of the Scotian Shelf (Div.4W) where big concentrations of Illex were observed at the bottom layers within 160-250 m in depth especially during early-to-mid autumn, while most of the catch of argentine were taken in mid summer from the southwestern edge of the Scotian Shelf (Div.4X) at the bottom layers within 140-180 m in depth by the repetition of short-term direct fisheries made by those vessels switched from the fishing for Illex temporarily.

Besides the abovementioned fishery within the limit of the Japanese catch quotas, Japanese trawlers carried out the Illex fishery under a part of the Canadian quota entrusted to them by the arrangement between Japanese and Canadian fishing industries. These two fisheries were continued concurrently

within nearly the same extent of the fishing grounds and seasons, and the vessels engaged in either of the two fisheries successively in accordance with the prearranged fishing schemes. More general and detailed information on the fishing activities made by Japanese trawlers including this special Illex fishery was given in another fishery report (ICNAF Res.Doc.79/II/22).

B. Special Research Studies

1. A joint Canada-Japan study on mesh selectivity for Illex using a bottom trawl

As a joint Canada-Japan 1978 research project, mesh selection experiments were made on the Scotian Shelf using a Japanese commercial trawler, Shirane Maru. This project consisted of two one-month cruises (June 3 - July 4 and October 16 - November 16, 1978) during the early and late periods of the fishing season. The selection experiments were carried out by the covered cod-end method using the three cod-ends with nominal mesh sizes of 45, 60 and 90 mm and the four cod-ends with 60, 90, 100 and 130 mm mesh sizes in the first and second cruises, respectively. During each of these cruises, a total of 220 and 173 trawling operations were conducted within the specific areas prearranged for the study. On the basis of the available selection data obtained, the relationship between 50 % retention length of Illex and cod-end mesh size and other related factors on mesh selectivity were estimated. The full description of this study and the results obtained were shown in a separate paper (ICNAF Res.Doc.79/II/35).

2. Estimation of the Illex biomass on the southern edge of the Scotian Shelf

This study was made to get some available information on the Illex biomass in the most important fishing grounds for Japanese Illex fisheries for the reasonable evaluation of the TAC.

The biomass estimation was carried out by means of the areal expansion method on the basis of the haul-by-haul catch and effort data reported from Japanese commercial trawlers in 1978. The calculation was made on the basis of the standardized values of CPUE by month, by half-a-degree square blocks and by depth zone consisted of twelve strata within the depth of 60-200 fathoms and corresponding areas of fishing grounds covered by the Japanese fleet.

The maximum biomass estimate of 42,900 tons was obtained for September in 1978, but this figure seemed to be fairly underestimated because the area covered by the Japanese fleet in that month was about one-eighths of the total area within the same depth range in Subarea 4 where some Illex may be distributed. The full description of this study and the results were reported in a separate paper (ICNAF Res.Doc.79/II/20).

3. SUBAREA 5

A. Status of the Fisheries

The Illex and the Loligo-butterfish fisheries were carried out in autumn and winter, respectively. Most of the vessels operated using off-bottom trawl gear with the 60 mm cod-end mesh in nominal size. The total catch from this Subarea showed a slight decrease from 2,900 tons in 1977 to 2,400 tons in 1978 with the reduction of corresponding fishing effort from 6,400 hours to 5,200 hours (Table 2).

The joint Loligo-butterfish fishery was made on the southern edge of the Georges Bank in Subdiv. 5Zw. The combined catch of Loligo (1,200 tons) and butterfish (400 tons) accounted for 51 % of the total catch from this Subarea, but the Loligo catch showed an appreciable decrease and remained at 57% of that in the previous year.

A small-scale Illex fishery was carried out in October and November on the southeastern edge of the Georges Bank in Subdiv. 5Ze. Merely 700 tons of Illex were taken by the direct fishery, but it is noticeable that the catch was about eight times of that in the previous year (Table 2).

STATISTICAL AREA 6 (Div. 6ABC)

A. Status of the Fisheries

The joint Loligo-butterfish and the Illex fisheries were carried out in the different fishing grounds and seasons, but most of the vessels operated using off-bottom trawl gears with the 60 mm cod-end mesh in the same way as the case in Subarea 5. The total catch from this area showed a substantial decrease from 12,100 tons in 1977 to 3,800 tons in 1978 with the reduction of corresponding fishing effort from 22,900 hours in 1977 to 10,300 hours in 1978. This noticeable change in total catch was caused mainly by a sharp drop in the catches of Loligo and Illex, and the combined catch of these squids (3,300 tons) accounted for only 32 % of that in the previous year (Table 2).

The joint Loligo-butterfish fishery was made in winter on the edge of the continental shelf in each Divisions. The Loligo catch (1,100 tons) accounted for 29 % of the total catch from this area, but remained at merely 19 % of that in the previous year. The catch of butterfish also showed a sharp decrease from 1,100 tons in 1977 to 200 tons in 1978.

The Illex fishery were carried out in Div. 6B from July to September. The Illex catch (2,200 tons) accounted for 57 % of the total catch from this area, but it remained at 36 % of the Illex catch in the previous year.

Table 1. Historical series data on Japanese catches and fishing effort in the ICNAF waters, 1968-1978.

Year	Hours fished (1000 hours)	Total catch (1000 tons)	Catches of commercially important species (1000 tons)						
			Herring	Argentine Capelin	Red fish	Butter fish	Loligo	Illex	
1968	6.9	11.3	0.2	1.3	-	1.4	3.5	0.2	1.7
1969	18.2	19.7	0.6	2.3	-	0.9	3.9	7.1	0.6
1970	29.5	37.9	1.5	4.1	-	3.6	8.6	13.2	0.5
1971	28.5	43.3	3.2	9.1	-	8.8	5.8	11.4	0.2
1972	26.6	33.7	2.7	0.7	-	3.7	3.8	15.9	2.4
1973	34.0	40.9	2.8	0.4	-	4.7	12.2	14.5	1.1
1974	38.9	28.8	3.4	0.6	-	0.8	4.6	13.4	3.6
1975	31.0	24.9	2.1	0.2	2.8	0.1	4.2	11.2	3.4
1976	40.1	26.1	0.9	0.4	5.1	0.1	7.9	5.2	6.2
1977	38.4	25.3	0.0	2.1	5.1	0.2	1.7	7.8	7.8
1978	25.1*	13.2*	—*	1.5*	0.8*	—*	0.3*	2.3*	7.3*

* provisional figures

Table 2. Provisional Japanese catches(tons) and fishing effort(hours fished) for 1987 in the ICNAF waters.
 Figures in parentheses denote the fishing effort in days fished, and the underlined figures
 denote the fishing effort directed to the caplin fisheries.

1) Canadian waters

Division	Species	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	TOTAL in 1977	EFFORT in 1978	EFFORT in 1977
3L	Illex	-	-	-	-	-	-	1	-	-	1	-	109	184
	Capelin	-	-	124	-	-	-	-	-	-	124	212	(14)	(20)
	Argentine	-	-	-	-	-	-	-	-	-	-	-	<u>653</u>	<u>38</u>
	Others	-	-	27	-	-	-	0	-	-	27	91	(<u>67</u>)	(<u>5</u>)
	Total	-	-	151	-	-	-	1	-	-	152	303		
3N	Illex	-	-	-	-	-	3	-	-	-	3	-	271	2518
	Capelin	-	-	659	3	-	-	-	-	-	662	3704	(35)	(175)
	Argentine	-	-	-	-	-	-	-	-	-	-	-	<u>2351</u>	<u>2300</u>
	Others	-	-	40	0	-	0	-	-	-	40	1	(197)	(157)
	Total	-	-	699	3	-	3	-	-	-	705	3705		
3O	Illex	-	-	-	23	364	135	24	-	-	546	0	611	190
	Capelin	-	-	2	2	-	-	-	-	-	4	41	(65)	(20)
	Argentine	-	-	-	-	-	0	-	-	-	0	-	<u>162</u>	<u>183</u>
	Others	-	-	-	0	2	1	1	-	-	4	0	(<u>34</u>)	(<u>18</u>)
	Total	-	-	2	25	366	136	25	-	-	554	41		
4V	Illex	-	-	1	4	206	401	14	46	-	672	188	720	96
	Capelin	-	-	-	-	-	-	-	-	-	-	-	(71)	(19)
	Argentine	-	-	4	-	87	46	0	1	-	138	5		
	Others	-	-	16	-	1	3	13	21	-	54	16		
	Total	-	-	21	4	294	450	27	67	-	864	209		
4W	Illex	-	-	8	935	355	342	624	660	-	2924	2607	3250	4312
	Capelin	-	-	-	-	-	-	-	-	-	-	-	(285)	(337)
	Argentine	-	-	1	51	113	16	15	34	-	230	1038		
	Others	-	-	66	19	3	0	8	11	-	107	13		
	Total	-	-	75	1005	471	358	647	705	-	3261	3657		
4X	Illex	-	-	-	38	149	4	123	16	-	330	345	1212	1099
	Capelin	-	-	-	-	-	-	-	-	-	-	-	(108)	(83)
	Argentine	-	-	-	371	473	46	221	15	-	1126	1071		
	Others	-	-	0	4	6	-	5	3	-	18	3		
	Total	-	-	0	413	628	50	349	34	-	1474	1419		
TOTAL	Illex	-	-	9	1000	1074	885	786	722	-	4477	3140	5182	8399
	Capelin	-	-	785	5	-	-	-	-	-	789	3957	(578)	(654)
	Argentine	-	-	5	422	673	108	236	50	-	1494	2114	3166	2521
	Others	-	-	149	23	12	4	27	35	-	250	124	(298)	(180)
	Total	-	-	948	1450	1759	997	1049	807	-	7010	9334		

2) American waters

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Division	Species	Jan	Feb	Mar	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL in 1977	EFFORT in 1978	EFFORT in 1977
5Z	Loligo	227	106	64	-	-	-	1	18	764	1180	2086	
	Illex	-	-	-	1	-	-	283	372	-	656	80	6375
	Butterfish	61	28	30	-	-	-	-	15	306	440	649	(483)
	Silver hake	-	0	0	-	-	-	0	2	73	76	-	
	Other	6	14	5	-	-	-	1	2	26	54	85	
	Total	294	148	99	1	-	-	285	409	1169	2405	2900	
6A	Loligo	200	356	47	-	-	-	-	8	208	819	2323	
	Illex	0	1	-	1	-	-	2	-	4	4	159	5019
	Butterfish	22	73	15	-	-	-	-	1	62	173	504	(387)
	Silver hake	0	1	0	-	-	-	-	1	15	17	1	
	Others	2	20	4	-	-	-	-	-	15	41	13	
	Total	224	451	66	-	1	-	-	12	300	1054	3000	
6B	Loligo	1	-	-	-	-	-	-	3	114	118	1404	
	Illex	-	-	-	453	1065	292	-	2	-	1812	4254	11028
	Butterfish	-	-	-	-	0	-	-	1	33	34	235	(726)
	Silver hake	-	-	-	0	0	0	-	1	10	12	24	
	Others	0	-	-	2	3	0	-	1	9	15	366	
	Total	1	-	-	455	1068	292	-	8	166	1990	6283	
6C	Loligo	-	-	-	-	-	-	-	116	54	170	2021	
	Illex	-	-	-	-	-	-	-	348	-	348	138	6738
	Butterfish	-	-	-	-	-	-	-	6	5	11	351	(415)
	Silver hake	-	-	-	-	-	-	-	89	82	171	13	
	Others	-	-	-	-	-	-	-	33	21	54	261	
	Total	-	-	-	-	-	-	-	592	162	754	2784	
TOTAL	Loligo	428	462	111	-	-	-	1	145	1140	2287	7834	
	Illex	0	1	-	454	1066	292	283	724	-	2820	4631	29160
	Butterfish	83	101	45	-	0	-	-	23	406	658	1739	(2011)
	Silver hake	0	1	0	0	0	0	0	93	180	275	38	
	Others	8	34	9	2	3	0	1	36	71	164	725	
	Total	519	599	165	456	1069	292	285	1021	1797	6203	14967	

