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Outline of Japanese Squid Fishery in NAFO Subareas 3 and 4 in 1980

by

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General view of fishing operation

As the quota for 1980, Japan was allocated 17,000 tons of Illex squid, including the quota transfered from Canada, in Subareas 3 and 4, while it was 31,217 tons in 1979 including the quota reallocated under the Co-operative Fishery with Canada.

Japanese squid fishery started at the end of July and continued to the middle of November. The number of vessels licensed and actually operated in 1980 are shown in Table 1. Seventeen Japanese trawlers operated on and along the continental edges and slopes of the Scotian Shelf (Divs. 4Vs, W and X), up to around 350 m in depth. Compared with the year of 1979, sizes of the vessels were relatively larger in 1980. Most of them used two types of gear, i. e., bottom and off-bottom trawl gears. The mesh of cod-end ranged from 60 - 70 mm, irrespective of gear type and vessel size.

There was no operation of squid jigging vessels and the direct fishery for squid by Japanese trawlers was not performed in Subarea 3 in 1980.

Squid Catch, Effort and Fishing Grounds

Japanese squid catch and effort expended for squid by NAFO division in the 1980 fishing season are shown in Table 2. The total Illex catch by the direct fishery amounted to 15,880 tons, and 299 tons of squid were taken as by-catch of the argentine fishery. Total squid catch by

all Japanese vessels amounted to 16,179 tons which was slightly under the quota allocated to Japan for 1980.

Japanese fishing efforts were concentrated to Div. 4X, and squid catch in this division amounted to 12,253 tons which accounted for 77 % of total squid catch. On the contrary, in 1978 and 1979, direct fishery for squid was rarely performed in Div. 4X, and most of squid catch by Japanese trawlers were taken from Divs. 4Vs and W, especially from the vicinity of The Gully located on the border between Div. 4Vs and W. More detailed localities of fishing effort and squid catch in September are shown in Figs. 1 and 2, respectively.

The CPUEs of Illex by month and by division are shown in Table 3, and the CPUEs by 30'-square block are shown in Fig. 3. The value in Div. 4X was the highest throughout the fishing season, in contrary to the cases in 1978 and 1979 fishing seasons. The values of CPUE in 1980 were considerably lower than those in the previous two years. Namely, monthly catches per day and per hour, irrespective of division, were about a half or one third of the value in 1979, and around two thirds or a half of the value in 1978. It is suggested that the squid abundance in 1980 was the lowest among the latest three years.

The information for the status of the stock in the surface water layer was not obtained in 1980 because of the cease of jigging fishery.

Size Composition of Squid Catch

Monthly length composition and the mean length of the squid catch by Japanese trawlers in Subarea 4 are shown in Fig. 4 and Table 4, respectively. The composition shows they grew gradually larger from July to October and then became smaller in November. Monthly mean lengths in the 1980 fishing season were around 1 cm smaller than those in 1979 except November, and were nearly equal to those in 1978.

By-catch

The incidental catches of the other species by direct squid fishery in 1980 are shown in Table 5. Around 619 tons of by-catch, mainly composed of silver hake (37 %) and argentine (32 %), were caught in Subarea 4. Most of them were obtained from Div. 4X where Japanese fishing efforts were concentrated.

Discussion

In the summer of 1980, the fishing grounds were not formed in the vicinity of The Gully where the big concentration of squid was occurred in 1978 and 1979. Consequently, Japanese trawlers were obliged to move into Div. 4X where the density of squid was lower than in Divs. 4Vs and

W in 1978 and 1979. The density in Div. 4X was low in the 1980 fishing season as same as the previous two years. Also, the mean length was smaller in 1980 than in 1979. Some fishermen pointed out the low water temperature in the summer of 1980 which might relate to the low abundance and low growth of squid in the region.

Two reasons might be suggested as the cause of low abundance in Divs. 4Vs and W, namely, the abundance of the recruitment was lower in 1980 than in the previous years, or squid migrated to another feeding grounds and/or surface water layer. Therefore, the pre-season survey in the off-shelf area will be necessary to make clear the status of the recruitment to the fishing grounds.

Table 1. The number of Japanese vessels operated in 1980 fishing season in Subareas 3 and 4.

Tonnage class (GRT)	Number of vessels operated[1]					Number of licensed vessels	No. of the vessels in 1979
	Jul[2]	Aug	Sep	Oct	Nov[3]		
1,000 (991-1,000)	3	3	3	3	2	3	5
1,500 (1,246-1,499)	2	3	3	3	3	3	5
2,000 (1,949-2,538)	5	9	9	9	9	9	8
3,000 (3,219-3,280)	-	2	2	1	1	2	-
Total	10	17	17	16	15	17	18

1) Some vessels switched occasionally to the argentine fishery
2) The operations of all vessels were started after 25th of this month
3) The operations of all vessels were finished befor 17th of this month

Table 2. Illex squid catch in tons and effort expended by Japanese squid fishery in Subareas 3 and 4 in 1980. The catch and effort by the argentine fishery were excluded.

Month	Jul	Aug	Sep	Oct	Nov	Total	1979 total*
Days fished	39	447	409	385	154	1,434	1,093
Hours hauled	470	4,972	3,560	3,213	1,349	13,563	9,960
3N	-	-	-	-	-	-	14
3O	-	-	-	-	-	-	724
4Vs	4	-	0	-	-	4	8,823
4W	349	2,875	221	38	141	3,623	13,463
4X	31	2,651	4,498	3,744	1,328	12,253	205
Total	384	5,526	4,719	3,782	1,469	15,880	23,229

* excluding the Jigging fishery

Table 3. Illex CPUE for Japanese trawlers in recent three years, irrespective of vessel size and gear type.

Month	Div.	1978* Catch in tons	1978* CPUE in tons /day	1978* CPUE in tons /hour	1979* Catch in tons	1979* CPUE in tons /day	1979* CPUE in tons /hour	1980 Catch in tons	1980 CPUE in tons /day	1980 CPUE in tons /hour
Jul	4Vs	128	128.0	6.4	-	-	-	4	3.8	0.4
	4W	0	0.0	0.0	382	16.6	2.4	349	10.3	0.8
	4X	-	-	-	-	-	-	31	7.8	1.8
	Total	128	12.8	0.9	382	16.6	2.4	384	9.9	0.8
Aug	4Vs	558	29.4	2.0	150	37.5	6.0	-	-	-
	4W	1,869	24.3	1.8	2,233	26.6	2.7	2,875	10.5	0.8
	4X	83	9.2	0.7	21	21.0	2.3	2,651	15.2	2.0
	Total	2,510	23.9	1.7	2,404	27.0	2.8	5,526	12.4	1.1
Sep	4Vs	3,127	30.7	2.4	5,585	35.3	3.9	0	0.0	0.0
	4W	4,675	25.8	1.8	3,257	31.6	3.1	221	6.9	0.8
	4X	-	-	-	5	5.0	5.0	4,498	12.0	1.4
	Total	7,802	27.6	2.0	8,847	33.7	3.6	4,719	11.5	1.3
Oct	4Vs	234	13.0	1.2	1,958	33.2	3.0	-	-	-
	4W	9,051	26.5	1.9	4,283	36.3	3.3	38	1.7	0.4
	4X	184	7.7	0.6	-	-	-	3,744	10.3	1.2
	Total	9,469	24.7	1.8	6,241	35.3	3.2	3,782	9.8	1.2
Nov	4Vs	34	3.8	0.3	-	-	-	-	-	-
	4W	1,507	21.8	1.5	987	31.8	2.3	141	6.7	1.0
	4X	15	7.5	1.0	-	-	-	1,328	10.0	1.1
	Total	1,556	19.5	1.4	987	31.8	2.3	1,469	9.5	1.1

* based on the catch and effort within the limit of Canadian quota

Table 4. The mean length of squid caught by Japanese trawlers in Subarea 4, 1978 - 1980. N and M indicate the number of fish measured and mean mantle length in cm, respectively.

Month	1978 N	1978 M	1979 N	1979 M	1980 N	1980 M
Jul	1,801	19.2	1,001	19.6	198	18.6
Aug	2,215	20.9	1,274	22.2	1,703	21.2
Sep	2,508	22.7	1,990	22.8	2,842	22.2
Oct	2,006	23.3	1,994	24.4	1,831	23.2
Nov	402	23.6	198	24.5	804	22.6

Table 5. By-catch in tons and the percentage (in parentheses) in total species catch in direct squid fishery by Japanese trawlers in 1980 fishing season.

Div.	Haddock	Pollock	Silver hake	Redfish	Argentine	Total
4Vs	-	-	0	-	6	6 (0.0)
4W	8	4	74	1	0	93 (0.6)
4X	27	60	153	12	192	520 (3.2)
Total	35 (0.2)	64 (0.4)	227 (1.4)	13 (0.1)	198 (1.2)	619 (3.8)

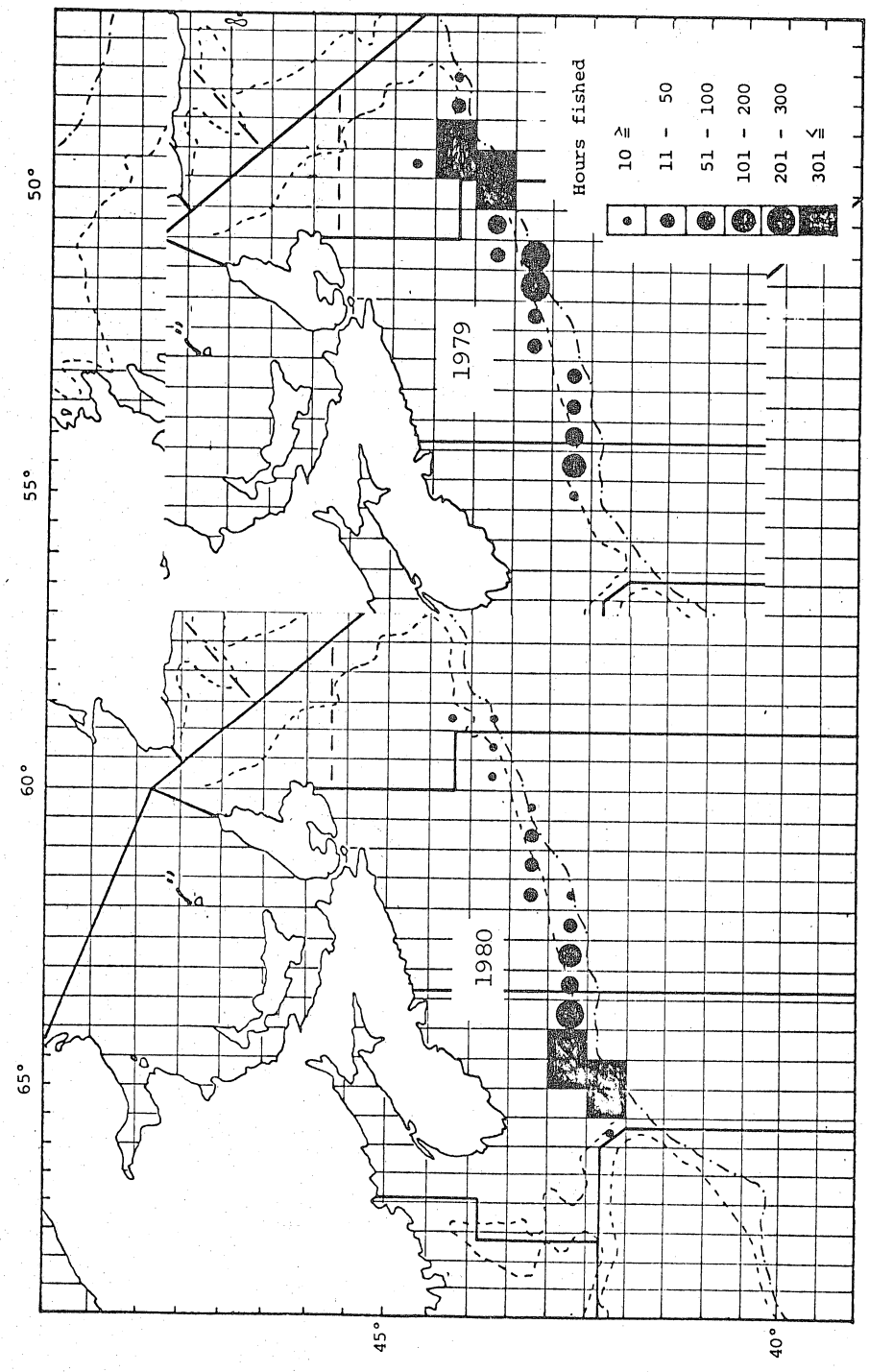

Fig. 1. Fishing effort expended by Japanese trawlers in Septembers 1979 and 1980, including the fishing effort directed to argentine.

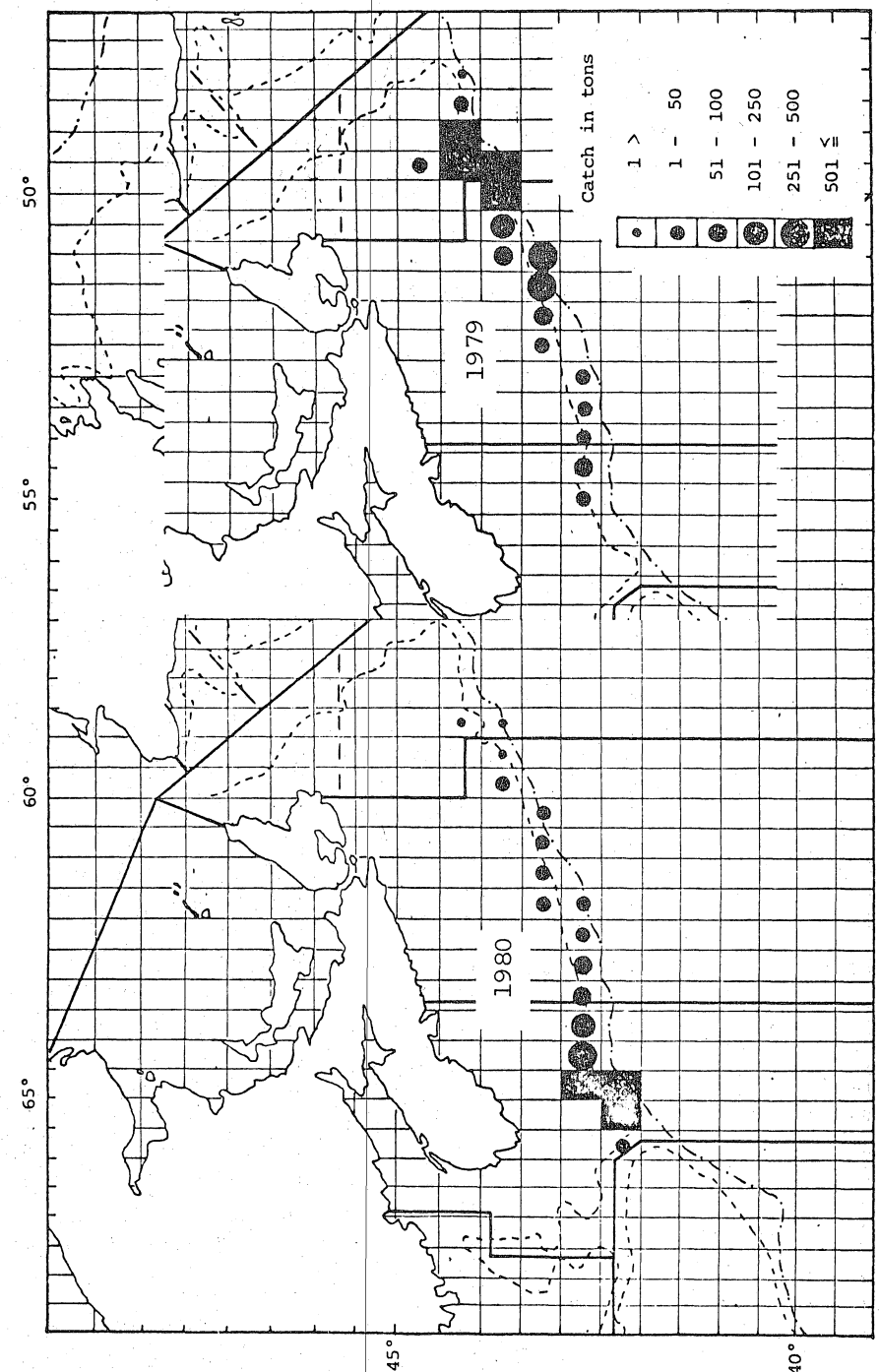

Fig. 2. Illex catch by Japanese trawlers in Septembers 1979 and 1980, including the catch by direct argentine fishery.

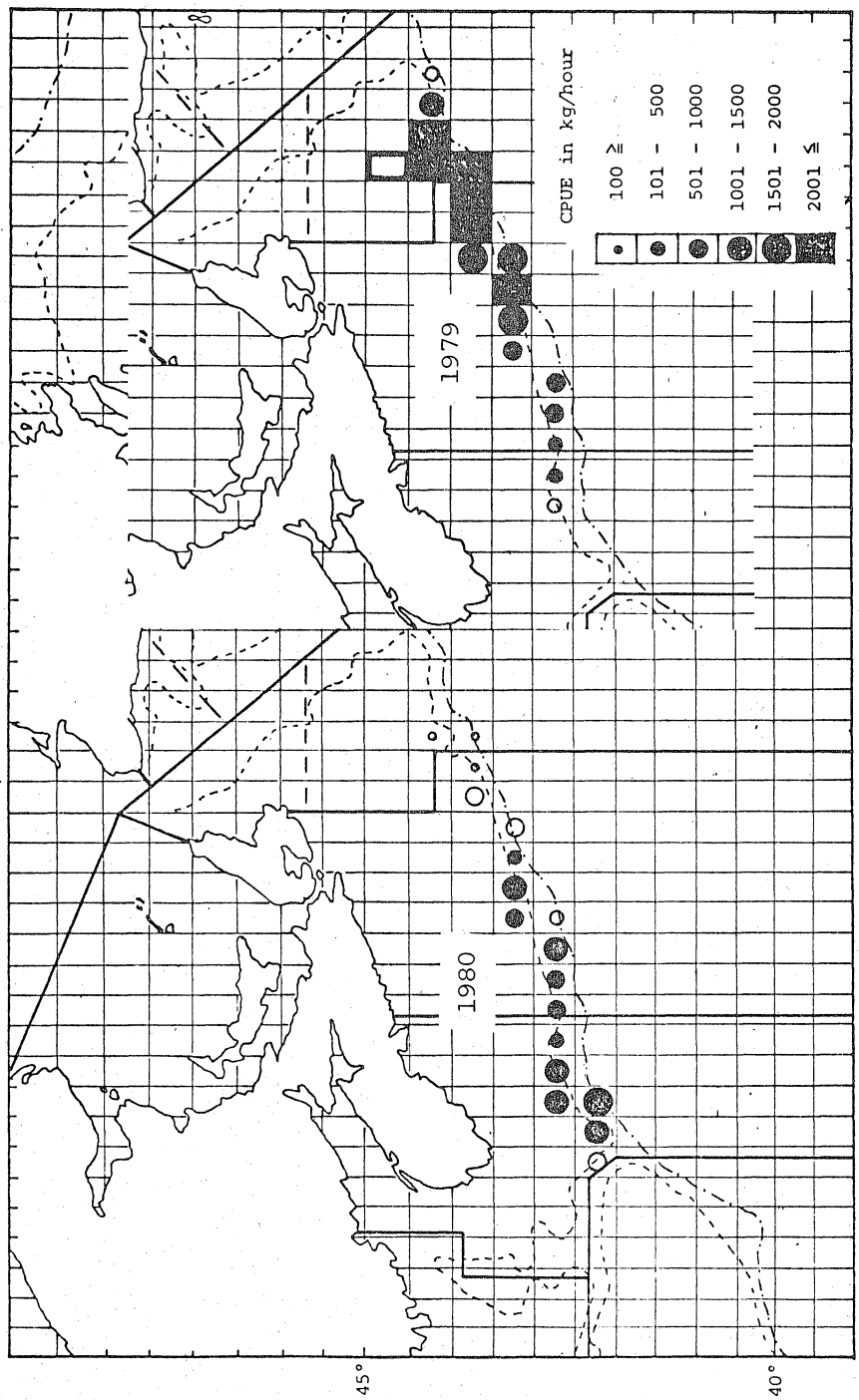

Fig. 3. Illex CPUE of Japanese trawlers in Septembers 1979 and 1980, irrespective of fishing gear and vessel size, based on the catch and effort data of all Japanese vessels. Open circles show the values in the block where fishing effort expended was less than 10 hours.

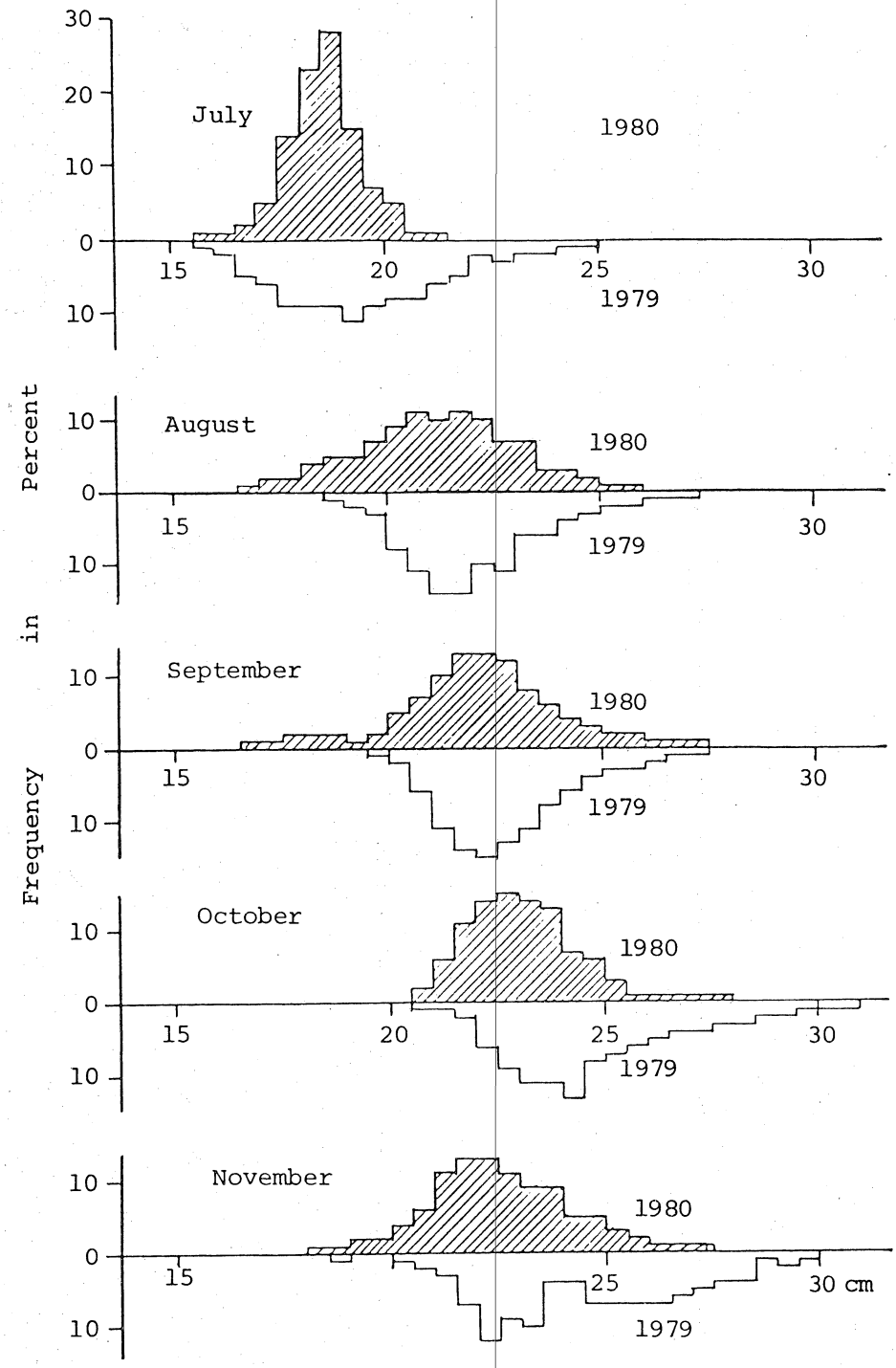

Fig. 4. Monthly length compositions of Illex catch by Japanese trawlers in Subarea 4 for 1979 and 1980, irrespective of fishing gear and mesh size. Number of fish measured is shown in Table 4.