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Japanese Research Report for 1979

by

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The allowable Japanese catch of Illex squid for 1979 from Subareas 3 and 4 amounted to a total of 31,217 tons, which consisted of the allowable catch of 4,600 tons as national quota and a part of the Canadian quota amounting to 19,117 tons and 7,500 tons permitted to the Japanese trawlers and squid jigging vessels, respectively, as the upper limits of Illex catch for the Co-operative Fishery (CF).

Under instructions from the NAFO executive office, all of the species catches taken by Japanese vessels engaging in the Co-operative fishery in 1979 were included in the Japanese nominal catch from Canadian waters for the year.

Consequently, the nominal total catch by Japanese trawl fishery from the NAFO waters (Subareas 3 to 5 and Statistical Area 6) showed a substantial increase from 14,700 tons in 1978 to 34,600 tons in 1979, the largest catch of any of the past six years (Table 1). However, it is noticed that the amount of Japanese catch in 1979 excluding the catch by Co-operative Fishery was merely 1.1 times as much as the total Japanese catch in 1978.

A total of 18 middle and large-sized trawlers operated extending over from Subarea 3 to Statistical Area 6 and engaged in the squid (Illex or Loligo), redfish or argentine fisheries on occasion, using either of the bottom or off-bottom gears. The mesh of cod-end employed was in the range from 45 mm to 135 mm, irrespective of gear type and vessel size. On the other hand, 7 squid jigging vessels operated in Subareas 3 and 4. 24-28 sets of automatic jigging machines were equipped in small vessels (100 GRT class), and 26-36 sets in larger ones (400 GRT class).

The provisional Japanese catch and effort statistics by division for 1979 are shown in Tables 2 and 3, which indicate that around 82 % (= 34,150 tons) of Japanese total catch (= 41,570 tons) were taken from Canadian waters. In regard to Japanese catches by species in 1979, the catch of Illex squid was overwhelmingly large, followed by Loligo squid, accounting for 81 % and 8 % of Japanese total catch from the NAFO waters, respectively.

It is further noticed that Japanese Illex catch from Canadian waters amounted to 30,730 tons which accounted for 91% of the total Illex catch by Japanese vessels in the NAFO waters. A more detailed description on the status of Japanese squid fisheries in Canadian waters was given in a separate paper (NAFO SCR Doc. 80/II/8).

The outlines of Japanese trawl and squid jigging fisheries operated in each Subarea concerned and in Statistical Area 6 in 1979 and of related research activities are as follows.

1. SUBAREA 3 (Div. 3LMNO)

A. Status of the Fisheries

Two kinds of trawl fishery, i.e., squid (Illex) and redfish fisheries, and a squid jigging fishery were carried out in 1979.

The small-scale squid fisheries by trawlers and jigging vessels were made from July to November mainly in Div. 3O. Some trawlers operated on and along the southwestern edge of the Grand Bank, while most of the jigging vessels operated mainly over the shallower waters off the St. Marys Bay of Newfoundland (refer to NAFO SCR Doc. 80/II/8). Consequently, a total of 1,260 tons of Illex was taken from this Subarea, which accounted for merely 4 % of Japanese Illex catch from Canadian waters in 1979 (Table 2-4)).

On the other hand, a short-term redfish fishery was made from March to May on and around the Flemish Cap in Div. 3M, where the majority of Japanese redfish catch in 1979 was taken (Table 2-4)).

2. SUBAREA 4 (Div. 4VWX)

A. Status of the Fisheries

Two different trawl fisheries for Illex squid and for argentine as well as a squid jigging fishery were carried out in 1979.

The Illex fishery by trawlers was performed from July to November on and along the southern edge of the Scotian Shelf where more dense concentrations of squid than those in the previous year were observed throughout the fishing seasons (refer to NAFO SCR Doc. 80/II/8). Including 500 tons of squid taken as by-catch of the argentine fishery, the Illex catch by trawlers from this Subarea amounted to 22,990 tons which accounted for around 90 % of the corresponding Japanese total species catch from this Subarea. Of the Illex catches by division, the catch from Div. 4W was largest, followed by Div. 4Vs, accounting for 59 % and 39 % of the total Illex catch by trawlers from this Subarea, respectively (Table 2-4)).

On the other hand, the squid jigging vessels operated widely over the Scotian Shelf from July to November and also in December in Div. 4Vs. The total Illex catch by jigging vessels in this Subarea amounted to 6,380 tons accounting

for 91 % of the total squid catch by Japanese jigging fishery from Canadian waters in 1979. The largest Illex catch was reported from Div. 4Vn, followed by Div. 4Vs, and the combined Illex catch from Div. 4Vn and 4Vs reached about 61 % of the total Illex catch by jigging fishery from this Subarea. The main fishing season was observed in autumn, from September to November, in Div. 4Vn and 4Vs, while in Div. 4W and 4X it occurred in the slightly earlier period from August to October (Table 2-3)).

The argentine fishery was carried out from July to November mainly in Div. 4X. The majority of argentine catch by the direct fishery was taken from the southwestern edge of the Scotian Shelf by those vessels which switched occasionally to the fishery from the squid fishery. A total of 2,410 tons of argentine, including about 820 tons of fish as by-catch of the squid fishery, was taken by Japanese trawlers from this Subarea, and around 58 % of this catch were obtained from Div. 4X centering in early and middle autumn in 1979 (Table 2-4)).

B. Special Research Studies

1. A joint Canada-Japan research on the emigration and biology of shortfinned squid, *Illex illecebrosus*.

As a joint Canada-Japan 1979 research project, a survey on the emigration and biology of Illex squid in autumn-winter seasons was performed over the NAFO Subarea 4 using a Japanese commercial trawler, Hakurei-Maru (991 GRT).

This project consisted of two cruises (Oct.23 - Nov. 10 and Nov. 11 - 29, 1979) during the late and closing periods of the fishing season in Canadian waters. During those two cruises, a total of 186 trawl operations (90 bottom trawl and 96 midwater trawl tows included) were conducted at the specific research stations within each depth stratified research area prearranged on and along the southern edge of the Scotian Shelf and in the deeper waters southward of the edge and extending into the Gulf Stream to collect larva, juvenile and mature female specimens of Illex squid.

A great deal of available information on the geographical, temporal and diurnal changes in size compositions and mean catch rate of mature squid, stomach contents and amount of larva and juveniles caught, as well as corresponding oceanographic data, were obtained through those trawl operations. Some indications of possible spawning emigration or emigration of mature squid to deeper waters and the presence of larva and juveniles outside the Scotian Shelf at the time of the year were thus obtained from the close examinations of various bio-ecological data collected.

The full description of this study and the results obtained were shown in a separate paper (NAFO SCR Doc. 80/II/40).

2. Estimation of the maximum *Illex* biomass during the 1979 fishing season 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 fishery in

favor of the reasonable evaluation of the TAC for 1980.

The biomass estimation was performed by means of the areal expansion method using the haul-by-haul catch and effort data reported from all Japanese commercial trawlers engaging in the squid fishery. 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 composed of seven depth strata within a depth range of 70 - 200 fathoms, the corresponding areas of fishing grounds covered by Japanese fleet and the total area of the southern edge within the same depth range in Subarea 4 where some Illex squid may be distributed.

The maximum biomass estimate of 690,000 tons was thus obtained for September in 1979, which is about 2.8 times as much as the corresponding biomass estimate for 1978.

The full description of this study and the results obtained were shown in a separate paper (NAFO SCR Doc. 80/II/9).

3. SUBAREA 5

A. Status of the Fisheries

Both of the Loligo and Illex fisheries were carried out by Japanese trawlers in 1979. Most of the vessels operated using off-bottom gear with 60 mm cod-end mesh in nominal size. Japanese total catch from this Subarea showed a noticeable decrease from 2,600 tons in 1978 to 1,760 tons in 1979, though the corresponding fishing effort in each year remained rather stably at around 5,000 hours fished (Table 3).

The loligo fishery was made from January to March and also in December along the southeastern and southern edges of the Georges Bank in Div. 5Ze and 5Zw. Consequently, a total of 1,160 tons of Loligo squid was taken centering in January and in March, which accounted for 66 % and 95 % of the corresponding total species catch in 1979 and of the Loligo catch in the previous year from this Subarea, respectively (Table 3).

A small-scale Illex fishery was made in November in Div. 5Ze and 5Zw, and merely 70 tons of Illex squid were taken by the direct fishery. A total of 140 tons of Illex catch was reported from this Subarea in 1979, and this catch accounted for merely 16 % of the corresponding Illex catch in 1978.

4. STATISTICAL AREA 6 (Div. 6ABC)

A. Status of the Fisheries

Both of the Loligo and Illex fisheries were performed in the same or different fishing grounds and seasons, but most of the vessels operated using off-bottom trawl gear with 60 mm cod-end mesh in the same way as the case in Subarea 5. Japanese total catch from this Area showed an appreciable increase from 4,470 tons in 1978 to 5,670 tons in 1979, with a slight increase in cor-

responding fishing effort from 10,880 hours to 11,560 hours fished (Table 3).

The Loligo fishery was made in winter (January to March and in December) along the edge of the continental shelf in each Division, and a total of 2,010 tons of Loligo squid was taken by the direct fishery. The biggest concentration of wintering squids was observed in Div. 6A likewise the case in the previous year, and thus the Loligo catch from Div. 6A accounted for 64 % of the total Loligo catch from this Area in 1979. The total Loligo catch from this Area in 1979 was about 1.4 times as much as that in 1978, and accounted for 35 % of the total species catch from this Area in 1979.

The Illex fishery was performed from June to September and again in November and December mainly on the continental edge in Div. 6B, and a total of 2,830 tons of Illex squid was taken by the direct fishery, which accounted for around 96 % of the total Illex catch taken from this Area in 1979. The Illex catch (2784 tons) from Div. 6B in 1979 was about 1.6 times as much as that in 1978, and accounted for 98 % and 52 % of the total Illex catch and of the total species catch by Japanese trawlers from this Area in 1979, respectively (Table 3).

Table 1. Historical series data on catch and fishing effort by Japanese trawl fishery in the ICNAF/NAFO waters, 1968 - 1979.

Year	Hours fished (1000 hours)	Total catch (1000 tons)	Catches of commercially important species(1000 tons)							
			Silver hake	Herring	Argentine	Capelin	Red- fish	Butter- fish	Loligo	Illex
1968	6.9	11.3	0.2	0.2	1.3	-	1.4	3.5	0.2	1.7
1969	18.2	19.7	0.5	0.6	2.3	-	0.9	3.9	7.1	0.6
1970	29.5	37.9	0.5	1.5	4.1	-	3.6	8.6	13.2	0.5
1971	28.5	43.3	0.3	3.2	9.1	-	8.8	5.8	11.4	0.2
1972	26.6	33.7	0.5	2.7	0.7	-	3.7	3.8	15.9	2.4
1973	34.0	40.9	0.5	2.8	0.4	-	4.7	12.2	14.5	1.1
1974	38.9	28.8	0.2	3.4	0.6	-	0.8	4.6	13.4	3.6
1975	31.0	24.9	0.1	2.1	0.2	2.8	0.1	4.2	11.2	3.4
1976	40.1	26.1	0.1	0.9	0.4	5.1	0.1	7.9	5.2	6.2
1977	38.4	25.3	0.1	0.0	2.1	5.1	0.2	1.7	7.8	7.8
1978	25.7	14.7	0.3	0.0	1.5	0.8	0.4	0.7	2.9	7.9
1979	29.9*	34.6*	0.9*	0.0*	2.4*	-	0.7*	0.3*	3.2*	26.8*

* provisional figures including the Co-operative Fishery (CF).

Table 2. Provisional catches(tons) and fishing efforts(hours and/or days fished) for 1979 by Japanese trawl and squid jigging fisheries in Canadian waters and Division 3M.

Figures in parentheses denote the fishing efforts in days fished.

1) Trawl fishery under the national quota.

Division	Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	TOTAL in 1978
2J + 3KL	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	193
	Illex	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	Silver hake	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Redfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Argentine	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-	-	-	-	-	-	192
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	733 (72)
3M	Total	-	-	334	148	291	-	-	-	-	-	-	-	772	392
	Illex	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver hake	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Redfish	-	-	320	114	202	-	-	-	-	-	-	-	636	321
	Argentine	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Others	-	-	14	34	89	-	-	-	-	-	-	-	136	71
	EFFORT	(-)	(-)	917 (78)	333 (32)	482 (47)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	1731 (157)	668 (78)
3N	Total	-	-	-	-	-	-	-	-	-	-	14	-	14	650
	Illex	-	-	-	-	-	-	-	-	-	-	14	-	14	31
	Silver hake	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Redfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Argentine	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-	-	-	-	-	-	619
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(1)	(-)	4 (1)	2425 (222)	
3O	Total	-	-	-	-	-	-	237	9	137	-	39	-	423	561
	Illex	-	-	-	-	-	-	232	7	137	-	39	-	414	555
	Silver hake	-	-	-	-	-	-	0	0	0	-	-	-	1	0
	Redfish	-	-	-	-	-	-	1	1	0	-	-	-	2	2
	Argentine	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	4	1	0	-	-	-	6	4
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	125 (14)	26 (8)	137 (9)	(-)	18 (4)	(-)	306 (35)	890 (107)
4Vs	Total	-	-	-	-	-	-	1	123	749	810	52	-	1735	1123
	Illex	-	-	-	-	-	-	1	57	562	527	40	-	1188	932
	Silver hake	-	-	-	-	-	-	0	0	3	8	0	-	11	20
	Redfish	-	-	-	-	-	-	-	-	-	1	1	-	2	19
	Argentine	-	-	-	-	-	-	-	66	184	272	10	-	532	137
	Others	-	-	-	-	-	-	-	0	0	2	1	-	3	15
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	2 (1)	42 (10)	256 (52)	568 (75)	48 (10)	(-)	917 (148)	776 (77)
4W	Total	-	-	-	-	-	-	470	814	224	698	638	-	2844	3399
	Illex	-	-	-	-	-	-	395	518	187	638	615	-	2352	2951
	Silver hake	-	-	-	-	-	-	8	4	0	7	0	-	20	37
	Redfish	-	-	-	-	-	-	-	-	-	3	3	-	6	21
	Argentine	-	-	-	-	-	-	66	291	37	48	19	-	462	319
	Others	-	-	-	-	-	-	1	1	0	2	1	-	4	71
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	362 (37)	619 (68)	169 (23)	653 (91)	844 (86)	(-)	2647 (305)	3388 (300)
4X	Total	-	-	-	-	-	-	341	88	318	1081	192	-	2020	1347
	Illex	-	-	-	-	-	-	140	28	83	259	74	-	585	309
	Silver hake	-	-	-	-	-	-	1	0	2	2	0	-	6	3
	Redfish	-	-	-	-	-	-	-	-	0	0	3	-	3	-
	Argentine	-	-	-	-	-	-	193	58	233	814	115	-	1413	1024
	Others	-	-	-	-	-	-	7	2	0	6	0	-	13	11
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	355 (36)	84 (12)	269 (24)	831 (76)	131 (17)	(-)	1669 (165)	1072 (95)
TOTAL	Total	-	-	334	148	291	-	1049	1033	1429	2589	936	-	7809	7663
	Illex	-	-	-	-	-	-	768	610	968	1425	783	-	4553	4778
	Silver hake	-	-	-	-	-	-	10	4	5	17	1	-	37	60
	Redfish	-	-	320	114	202	-	1	1	1	5	6	-	649	364
	Argentine	-	-	-	-	-	-	259	415	454	1135	144	-	2406	1480
	Others	-	-	14	34	89	-	11	3	1	7	2	-	164	981
	EFFORT	(-)	(-)	917 (78)	333 (32)	412 (47)	(-)	843 (88)	772 (98)	831 (108)	2052 (242)	1044 (118)	(-)	7273 (811)	9952 (951)

Table 2. Cont'd

2) Trawl fishery based on the Co-operative Fishery (CF).

Division	Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
30	Total	-	-	-	-	-	-	-	156	153	-	-	-	309
	Illex	-	-	-	-	-	-	-	156	153	-	-	-	309
	Silver hake	-	-	-	-	-	-	-	-	-	-	-	-	-
	Redfish	-	-	-	-	-	-	-	0	0	-	-	-	0
	Argentine	-	-	-	-	-	-	-	-	0	-	-	-	0
	Others	-	-	-	-	-	-	-	0	-	-	-	-	0
EFFORT	-	-	-	-	-	-	-	-	64	29	-	-	-	93
		(-)	(-)	(-)	(-)	(-)	(-)	(-)	(6)	(3)	(-)	(-)	(-)	(9)
4Vs	Total	-	-	-	-	-	-	-	150	5599	1958	-	-	7708
	Illex	-	-	-	-	-	-	-	150	5586	1958	-	-	7693
	Silver hake	-	-	-	-	-	-	-	0	1	0	-	-	1
	Redfish	-	-	-	-	-	-	-	-	-	1	-	-	1
	Argentine	-	-	-	-	-	-	-	-	-	0	-	-	0
	Others	-	-	-	-	-	-	-	0	12	0	-	-	13
EFFORT	-	-	-	-	-	-	-	-	25	1433	646	-	-	2104
		(-)	(-)	(-)	(-)	(-)	(-)	(-)	(4)	(158)	(59)	(-)	(-)	(221)
4W	Total	-	-	-	-	-	-	492	2267	3260	4283	988	-	11290
	Illex	-	-	-	-	-	-	383	2233	3257	4283	988	-	11144
	Silver hake	-	-	-	-	-	-	108	33	1	0	-	-	142
	Redfish	-	-	-	-	-	-	-	0	0	-	-	-	0
	Argentine	-	-	-	-	-	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	1	1	2	-	-	-	4
EFFORT	-	-	-	-	-	-	-	158	824	1055	1294	421	-	3753
		(-)	(-)	(-)	(-)	(-)	(-)	(23)	(84)	(103)	(118)	(31)	(-)	(359)
4X	Total	-	-	-	-	-	-	-	23	5	-	-	-	28
	Illex	-	-	-	-	-	-	-	21	5	-	-	-	26
	Silver hake	-	-	-	-	-	-	-	2	-	-	-	-	2
	Redfish	-	-	-	-	-	-	-	-	-	-	-	-	-
	Argentine	-	-	-	-	-	-	-	0	-	-	-	-	0
	Others	-	-	-	-	-	-	-	0	-	-	-	-	0
EFFORT	-	-	-	-	-	-	-	-	9	1	-	-	-	10
		(-)	(-)	(-)	(-)	(-)	(-)	(-)	(1)	(1)	(-)	(-)	(-)	(2)
TOTAL	Total	-	-	-	-	-	-	492	2596	9017	6241	988	-	19334
	Illex	-	-	-	-	-	-	383	2559	9001	6241	988	-	19172
	Silver hake	-	-	-	-	-	-	108	35	2	0	-	-	145
	Redfish	-	-	-	-	-	-	-	0	0	1	-	-	1
	Argentine	-	-	-	-	-	-	-	0	0	0	-	-	0
	Others	-	-	-	-	-	-	1	2	14	-	-	-	16
EFFORT	-	-	-	-	-	-	-	158	922	2518	1940	421	-	5959
		(-)	(-)	(-)	(-)	(-)	(-)	(23)	(95)	(265)	(177)	(31)	(-)	(591)

3) Squid jiggling fishery based on the Co-operative Fishery (CF).

Division	Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
3L	Illex	-	-	-	-	-	-	-	-	6	85	-	-	91
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(1)	(6)	(-)	(-)	(7)
30	Illex	-	-	-	-	-	-	-	-	258	268	15	-	541
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(19)	(17)	(3)	(-)	(39)
4Vn	Illex	-	-	-	-	-	-	105	237	883	358	543	-	2126
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(15)	(22)	(65)	(32)	(32)	(-)	(166)
4Vs	Illex	-	-	-	-	-	-	29	388	353	390	578	35	1773
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(5)	(21)	(29)	(32)	(49)	(4)	(140)
4W	Illex	-	-	-	-	-	-	330	382	236	443	271	-	1662
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(31)	(40)	(30)	(43)	(21)	(-)	(165)
4X	Illex	-	-	-	-	-	-	-	276	172	366	-	-	814
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(22)	(22)	(22)	(-)	(-)	(66)
TOTAL	Illex	-	-	-	-	-	-	464	1283	1908	1910	1407	35	7007
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(51)	(105)	(166)	(152)	(105)	(4)	(583)

Table 2. Cont'd

4) All Japanese fisheries (trawl fisheries + squid jigging fishery).

Division	Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
3L	Total	-	-	-	-	-	-	-	-	6	85	-	-	91
	Illex	-	-	-	-	-	-	-	-	6	85	-	-	91
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(1)	(6)	(-)	(-)	(7)
3M	Total	-	-	334	148	291	-	-	-	-	-	-	-	772
	Illex	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver hake	-	-	-	-	-	-	-	-	-	-	-	-	-
	Redfish	-	-	320	114	202	-	-	-	-	-	-	-	636
	Trgentine	-	-	-	-	-	-	-	-	-	-	-	-	-
	Others	-	-	14	34	89	-	-	-	-	-	-	-	136
EFFORT	-	-	(78)	(32)	(47)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(157)	
3N	Total	-	-	-	-	-	-	-	-	-	-	14	-	14
	Illex	-	-	-	-	-	-	-	-	-	-	14	-	14
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(1)	(-)	(1)
3O	Total	-	-	-	-	-	-	237	165	549	268	54	-	1273
	Illex	-	-	-	-	-	-	232	162	548	268	54	-	1264
	Silver hake	-	-	-	-	-	-	-	0	0	-	-	-	1
	Redfish	-	-	-	-	-	-	1	1	1	-	-	-	2
	Argentine	-	-	-	-	-	-	-	-	0	-	-	-	0
	Others	-	-	-	-	-	-	4	2	0	-	-	-	6
EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(14)	(14)	(31)	(17)	(7)	(-)	(83)	
4Vn	Total	-	-	-	-	-	-	105	237	883	358	543	-	2126
	Illex	-	-	-	-	-	-	105	237	883	358	543	-	2126
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(15)	(22)	(65)	(32)	(32)	(-)	(166)
4Vs	Total	-	-	-	-	-	-	30	661	6701	3158	630	35	11216
	Illex	-	-	-	-	-	-	30	595	6501	2875	618	35	10654
	Silver hake	-	-	-	-	-	-	0	0	3	8	0	-	12
	Redfish	-	-	-	-	-	-	-	-	-	2	1	-	3
	Argentine	-	-	-	-	-	-	-	66	184	272	10	-	532
	Others	-	-	-	-	-	-	0	0	13	1	1	-	15
EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(6)	(35)	(239)	(166)	(59)	(4)	(509)	
4W	Total	-	-	-	-	-	-	1293	3462	3720	5424	1897	-	15796
	Illex	-	-	-	-	-	-	1108	3132	3680	5364	1874	-	15158
	Silver hake	-	-	-	-	-	-	116	37	1	7	0	-	162
	Redfish	-	-	-	-	-	-	-	0	0	3	3	-	6
	Argentine	-	-	-	-	-	-	66	291	37	48	19	-	462
	Others	-	-	-	-	-	-	3	2	2	2	1	-	8
EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(91)	(192)	(156)	(252)	(138)	(-)	(829)	
4X	Total	-	-	-	-	-	-	341	387	495	1447	192	-	2862
	Illex	-	-	-	-	-	-	140	325	259	625	74	-	1424
	Silver hake	-	-	-	-	-	-	1	2	2	2	0	-	7
	Redfish	-	-	-	-	-	-	-	-	0	0	3	-	3
	Argentine	-	-	-	-	-	-	193	58	233	814	115	-	1413
	Others	-	-	-	-	-	-	7	2	1	6	0	-	15
EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(36)	(35)	(47)	(98)	(17)	(-)	(233)	
TOTAL (Trawl fishery)	Total	-	-	334	148	291	-	1542	3629	10446	8830	1924	-	27142
	Illex	-	-	-	-	-	-	1150	3169	9968	7666	1770	-	23723
	Silver hake	-	-	-	-	-	-	118	40	7	17	1	-	183
	Redfish	-	-	320	114	202	-	1	1	1	5	6	-	650
	Argentine	-	-	-	-	-	-	259	415	454	1135	144	-	2406
	Others	-	-	14	34	89	-	14	4	16	7	3	-	180
EFFORT	-	-	917	333	482	-	1001	1694	3348	3992	1465	-	13232	
		(-)	(-)	(78)	(32)	(47)	(-)	(111)	(193)	(373)	(419)	(149)	(-)	(1401)
TOTAL	Total	-	-	334	148	291	-	2006	4912	12354	10740	3331	35	34149
	Illex	-	-	-	-	-	-	1614	4452	11876	9576	3177	35	30730
	Silver hake	-	-	-	-	-	-	118	40	7	17	1	-	183
	Redfish	-	-	320	114	202	-	1	1	1	5	6	-	650
	Argentine	-	-	-	-	-	-	259	415	454	1135	144	-	2406
	Others	-	-	14	34	89	-	14	4	16	7	3	-	180
EFFORT	(-)	(-)	(78)	(32)	(47)	(-)	(162)	(298)	(539)	(571)	(254)	(4)	(1984)	

Table 3. Provisional catch(tons) and fishing effort(hours and days fished) under the national quota for 1979 by Japanese trawl fishery in American waters.

Figures in parentheses denote the fishing efforts in days fished.

Division	Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL	TOTAL in 1978
5Y	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	5
	Illex	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Loligo	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Butterfish	-	-	-	-	-	-	-	-	-	-	-	-	-	3
	Silver hake	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EFFORT	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(1)
5Ze	Total	9	0	651	-	-	-	-	-	-	-	62	2	724	717
	Illex	0	-	25	-	-	-	-	-	-	-	36	0	62	634
	Loligo	2	0	477	-	-	-	-	-	-	-	1	1	481	64
	Butterfish	-	-	8	-	-	-	-	-	-	-	0	1	9	3
	Silver hake	5	0	125	-	-	-	-	-	-	-	6	0	137	5
	Others	2	0	16	-	-	-	-	-	-	-	19	0	35	11
	EFFORT	57 (5)	6 (4)	1246 (79)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	152 (14)	13 (4)	1475 (106)	994 (89)
5Zw	Total	415	197	86	-	-	-	-	-	-	-	48	284	1031	1885
	Illex	20	4	4	-	-	-	-	-	-	-	34	11	74	233
	Loligo	335	132	53	-	-	-	-	-	-	-	10	151	681	1156
	Butterfish	26	4	4	-	-	-	-	-	-	-	2	64	100	387
	Silver hake	20	41	19	-	-	-	-	-	-	-	1	14	96	68
	Others	14	16	6	-	-	-	-	-	-	-	1	44	80	41
	EFFORT	1744 (126)	884 (70)	293 (24)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	139 (20)	578 (73)	3638 (313)	3965 (333)
6A	Total	519	909	230	-	-	-	-	-	-	-	29	248	1935	1197
	Illex	60	18	8	-	-	-	-	-	-	-	18	35	139	14
	Loligo	376	592	140	-	-	-	-	-	-	-	10	164	1281	909
	Butterfish	42	29	7	-	-	-	-	-	-	-	1	42	121	216
	Silver hake	29	245	70	-	-	-	-	-	-	-	1	5	350	17
	Others	12	25	5	-	-	-	-	-	-	-	0	2	44	41
	EFFORT	2043 (169)	2812 (197)	632 (43)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	121 (13)	698 (76)	6305 (498)	4450 (360)
6B	Total	27	48	30	-	-	251	776	350	111	-	1324	646	3563	2011
	Illex	0	3	3	-	-	251	775	349	111	-	1113	178	2784	1767
	Loligo	21	41	17	-	-	-	-	-	-	-	161	364	604	185
	Butterfish	1	-	3	-	-	-	-	-	-	-	10	9	23	34
	Silver hake	4	1	5	-	-	0	0	1	-	-	28	67	106	10
	Others	1	3	2	-	-	-	1	0	-	-	12	28	46	15
	EFFORT	134 (13)	164 (13)	160 (13)	- (-)	- (-)	265 (20)	511 (56)	182 (45)	104 (7)	- (-)	1640 (179)	1817 (156)	4977 (502)	3865 (262)
6C	Total	-	-	-	-	-	-	-	-	-	-	76	98	174	1262
	Illex	-	-	-	-	-	-	-	-	-	-	5	34	39	658
	Loligo	-	-	-	-	-	-	-	-	-	-	70	55	124	393
	Butterfish	-	-	-	-	-	-	-	-	-	-	1	0	1	11
	Silver hake	-	-	-	-	-	-	-	-	-	-	0	9	9	152
	Others	-	-	-	-	-	-	-	-	-	-	1	-	1	48
	EFFORT	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	138 (16)	142 (16)	280 (32)	2460 (164)
TOTAL	Total	969	1155	996	-	-	251	776	350	111	-	1539	1278	7425	7077
	Illex	81	26	40	-	-	251	775	349	111	-	1206	258	3098	3308
	Loligo	733	765	687	-	-	-	-	-	-	-	251	735	3171	2706
	Butterfish	70	33	22	-	-	-	-	-	-	-	14	116	254	655
	Silver hake	59	287	219	-	-	0	0	1	-	-	36	95	697	251
	Others	26	44	28	-	-	-	1	0	-	-	32	74	205	157
	EFFORT	3978 (313)	3866 (284)	2332 (159)	- (-)	- (-)	265 (20)	511 (56)	182 (45)	104 (7)	- (-)	2191 (242)	3247 (325)	16675 (1451)	15743 (1209)