

# **National report of Japan<sup>1</sup>**

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**March 2005**

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<sup>1</sup> A working document submitted at the Fifth Meeting of the Interim Scientific Committee for Tuna and Tuna-Like Species in the North Pacific (ISC), March 28-30, 2005, Tokyo, Japan. Document not to be cited without permission of author.

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Total tunas landing of Japanese fisheries in the Pacific Ocean in 2002 was 220,097 metric ton (MT) and the landing of swordfish and billfishes was 19,009 MT (Anonymous 2004). Also 299,974 MT of skipjack was landed. Japanese tuna fisheries consist of three major fisheries, i.e., longline, purse seine, pole-and-line, and other miscellaneous fisheries like troll, drift-net, set-net fisheries. Since three major fisheries occupy more than 96 % of total tuna catch of Japanese fisheries in the recent years, those fisheries were focused on hereafter. This paper described the recent trend of the Japanese tuna fishery in the Pacific ocean and updated the statistics in the previous national report for ISC4 (Ogura 2004). Also there was brief description on Japanese research activities on tuna and tuna-like species in the Pacific Ocean in 2004 and early 2005.

## **1. Trends in fleet size**

The total number of longline vessels operated in 2002 was 1,446 (Table 1). The number of longline vessels of the largest size class (larger than 200 Gross Tonnage (GRT)) had been constant since the late 1960s. But, according to the agreement at the FAO's international action plan on fishing capacity, it went down by 22% from 1998 to 2002. Other size classes other than the smallest one (smaller than 20 GRT) showed sharp declines since the late 1980s.

The number of purse seine vessels shown in Table 1 includes only the vessel mainly targeting tunas. Although the total number of purse seine vessel was 54 in 2002, it was nearly one hundred in the 1980s. The number of the smaller size (smaller than 200 GRT) purse seine vessels has decreased since the late 1980's, the larger vessels which operate mainly in the tropical Pacific ocean do not show remarkable change in number.

In case of the pole and line fishery, the number of vessels larger than 20 GRT declined and the recent number of vessel (155) was almost one third of those in the 1980s. The number of vessels smaller than 20 GRT is difficult to follow the long-term trend, but it may be also declining.

## **2. Catch and effort trend by major fisheries**

Catch and effort data used in this paper are mostly based on the logbook data compiled by the National Research Institute of Far Seas Fisheries, Fisheries Research Agency (NRIFSF). For the coastal longline fishery, the statistical data by Statistics Department, Ministry of Agriculture, Forestry and Fishery was used (Anonymous 2004).

## Longline

Longline fisheries are classified by vessel size into three categories until 2001, i.e., coastal (vessels smaller than 20 GRT), offshore (20 - 120 GRT), and distant water (larger than 120 GRT). Since the fishery license system was changed in 2002, vessels of 10 – 20 GRT operating outside the Japanese EEZ were categorized as offshore vessel. Latest available statistics are provisional data in 2003 for offshore vessels larger than 20 GRT and distant water longliner and for 2002 for the coastal and offshore vessels smaller than 20 GRT.

Total cruise days of longline vessels smaller than 20 GRT have gradually increased since 1990 (Table 2). Effort data in 2002 is still unavailable. The effort in 2001 was 110 thousand days which was 45 % higher than that in 1980. Total catch of these vessels was nearly 40 thousand MT and albacore catch occupied almost half of the total catch in this fishery in recent years. Albacore catch has increased remarkably since 1993 and the catch in 1999 was seven times larger than that in 1980.

Total catch of longline vessels larger than 20 GRT (offshore and distant water fisheries) in both hemispheres were 88,386 MT in 2003 (Table 3). In the northern hemisphere in 2003, 110 million hooks were used and 46 thousands MT of fish was caught. In the southern part in 2003, the fishing effort was 105 million hooks and the catch was 42 thousands MT. Bigeye has been the dominant species for both areas and the catch in 2003 were nearly 25 thousands MT in the north and 17 thousand MT in the south.

The fishing effort remained stable at around 200 million of hooks for the north and 130 – 190 million of hooks in the south until the early 1990s and then it has decreased recently. Catch of bigeye, yellowfin and marlins in both areas had been stable in the 1980s, but it shows the decreasing trend in the 1990s. Catch of pacific bluefin tuna and albacore in the northern hemisphere showed some drops in the middle of the time series and there was also recent decrease in catch. The catch of swordfish appears to be stable. Annual distribution of fishing effort in 2002 and 2003 were shown in Figure 1.

The size of albacore measured at on board and landing site are ranging from 60 to 120 cm in fork length (FL) (Figure 2). The catch of bigeye and yellowfin had wider size ranges approximately from 60 to 180 cm but fish larger than 100 cm formed a dominant part of the catch. The size composition of the swordfish measured are ranging from 50 to 240 cm in eye-fork length.

## Purse seine

There are two different types of purse seiners that target tunas in Japan, i.e., single and group purse seine fisheries. The group seiner operates in the temperate northwestern Pacific and is consisting of one net purse seiner (100-200 GRT) and one searching vessel and two carrier vessels. New type of group seiner just launched at March 2005 with one relatively large seiner (300 GRT) and one carrier. The group purse seiner corresponds to the offshore purse seine fishery. The ship

hold fish in chilled water with ice. On the other hand, the single purse seiner (349-500 GRT) is fishing mainly in the tropical waters of the central and western Pacific, seasonally moving into the temperate water fishing ground. It is so called the distant water purse seine fishery.

Annual distribution of fishing effort (Figure 3) clearly showed that the fishing ground was well divided by latitude 20 N into the northern temperate waters around Japan and the tropical waters. The number of sets has been more or less stable, with a slight decreasing trend in both areas (Table 4). Total catch in the northern area varied from 25 thousands to 100 thousands MT. Skipjack catch in 1998 in this area was highest in the history, resulting the total catch in almost 100 thousands MT. Skipjack, yellowfin and pacific bluefin dominate in the catch in this area but catch of each species have been fluctuated. In the southern area, number of fishing effort increased rapidly till 1983 and then it was leveled off by the domestic regulation of the number of the license. Total catch in the south area were stable at around 150 thousands MT and more after mid 1980s. Skipjack occupies most of the catch followed by yellowfin and bigeye.

Skipjack caught by this fishery ranged from 30 to 70 cm in FL and bigeye had a size range from 30 to 100 cm (Figure 4). Most of the catch of yellowfin was also in the range of 30 – 80cm but there were some fish in the size range larger than 80 cm.

#### Pole and line fishery

The pole and line fishery is composed of three different categories, i.e., coastal (smaller than 20 GRT), offshore (20-120 GRT) and distant water (larger than 120 GRT) vessels. Annual catch by the coastal pole and line fishery is 10 thousands or less annually and is minor amount compared with that of the offshore and distant water pole and line fisheries.

As in the case of purse seine fishery, the fishing ground is separated by 20 N approximately (Figure 5). Southern most fishing area for the offshore pole and line vessels and some of distant water pole and line vessels smaller than 230 GRT is, in recent years, near 15 N but the important fishing ground for the offshore pole and line fisheries is waters north of 20 N around Japan and adjacent areas. These vessels keep fish in chilled water. On the other hand, the tropical waters has been a major fishing ground for distant water pole and line vessels (larger than 230 GRT) which keep fish in deep freeze. Also the temperate water from off Pacific coast of Japan to the Emperor Sea Mount is now important area for the albacore fishing ground in summer and autumn.

For both areas divided by 20N, fishing effort has been decreasing, especially for the southern area. The fishing effort in 2003 was about 41 % of 1980 for the northern area and 18 % of 1980 for the southern area. Despite the substantial reduction of the fishing effort, catch of skipjack and albacore in the northern area appears to be stable. In the northern area, recent skipjack and albacore catches were variable and 50 to 110 thousands MT and 20 to 50 thousands MT, respectively. Skipjack and yellowfin catches in the southern area, mainly by the distant water pole and line fishery, showed steep declines reflecting the concomitant reduction of the fishing effort.

The size of skipjack caught by this fishery has a range of 40 – 80 cm FL and albacore caught has a larger range of 50-100 cm with clear modes (Figure 6).

#### Other fisheries

There are miscellaneous small scale fisheries which catch tunas and tuna-like species in the Japanese coastal waters. Among them, the largest catch is made by the troll fishery with annual catch in 2002 of about 6,736 MT for tunas and 6,376 MT for skipjack (Anonymous 2004).

The large mesh drift net fishery, historically expanded the fishing ground covering areas of the temperate north and south Pacific in the 1980s, was suspended in 1991 in the south Pacific and in the high seas of the north Pacific in 1992 due to UN resolution implemented for large scaled drift gillnet fishery in the high seas.

#### Recent developments and trends of Pacific bluefin tuna, Swordfish, and Albacore fisheries

Annual Pacific bluefin tuna landings in Japan have been around 10,000 MT after 2000 and preliminary estimate of total landing in 2004 was 9,723 MT. In 2004, landings by longline fishery and purse seine fishery, both targeting adult fish, were relatively large, although landings from fisheries targeting juvenile were lower or similar level compared to those in the last decade. In recent years, the troll fishery catches age 0 fish in summer in the Pacific and autumn in the Sea of Japan not only for local market of the traditional food but also for the sea farming. Since precise catch amount for sea farming is unknown – it is likely to be around 20 – 40 MT, the Fisheries Agency of Japan starts effort to comprehend it.

Swordfish catch by offshore and distant water longliners in 2003 (4,959 MT) in the northern hemisphere was 20 % lower than that in 2002, which was mainly attributed to the decrease of number of offshore longliners targeting swordfish as well as the decrease of the swordfish catch rate. Limited information from port samplers suggests that swordfish catch rate of Japanese offshore surface longliners in winter fishing season of 2004 - 2005 is relatively high in comparing to those of 2002 – 2003 and 2003 - 2004, especially in the northeast Pacific.

The total albacore catch in Japan ranged from 55,000 MT to 92,000 MT in the past 5 years (1999-2003). Japan's catch of albacore are mainly made by longline and pole and line fisheries. The longline catch shows downward trend in the past five years due to both the decrease of the number of operation in the north Pacific and the decrease of catch rate. The pole and line catch largely varied and in 2004 that was estimated to be 32,000 MT corresponding to 10% below of the 2003 catch. It is different from usual year that the catch was made only in the early period (March to June) in its fishing season and was almost nothing in its usual high season (July to September) due to poor catch of the juveniles.

## **2. Compilation of basic fisheries data**

There are logbook systems for offshore and distant water longline, pole and line, and purse seine fisheries. From 1995, the logbook system has been also imposed on the coastal longline vessels (10 - 20 GRT) fishing both within and outside of the Japanese EEZ and these vessels were included in the offshore category at 2002. This means that all vessels larger than 20 GRT and from 2002 some longline vessels of 10 – 20 GRT are covered by logbook system and catch and effort data of these vessels are collected.

There are various small scale fisheries in the coastal waters of Japan such as troll and set net etc. which are not covered by the current logbook system, but their catch are covered by the landing statistics conducted by the Statistics Department of the Ministry of Agriculture, Forestry and Fisheries (Anonymous 2004).

The Fishery Agency of Japan, in cooperation with the NRIFSF and local prefectural fisheries experimental stations, has conducted the port sampling and the on board observer program. The length frequency distributions for major fisheries at the most of major tuna landing ports are obtained through the port sampling program.

### **3. Research activities**

Researches on tunas and tuna-like species in the Pacific ocean have been carried out by the NRIFSF for broad scientific areas of basic biology, behavior, and stock assessment. In addition, there are cooperative works with prefectural fisheries experimental stations and universities. Several cooperative studies are also on going with foreign countries including international organizations.

#### Research cruises in 2004 and 2005

There have been four research cruises in this fiscal year conducted by the Fisheries Agency of Japan and NRIFSF relating to tunas and billfish, except for several short cruises for tagging. Research longline operations on the R/V Shoyo-maru of the Fisheries Agency of Japan during September to November 2004 were conducted in the eastern Pacific ocean and biological samples and hooking depth information of marlins and drifting data of longline gear during operation were obtained. Total of 15 tunas and marlins were released with archival popup tags. Mitigation measure for marine turtle bycatch was also studied. Three research cruises for juvenile tunas distribution and schooling behavior were conducted by using a mid water trawl gear at the south of Japan in June 2004, at the Sea of Japan in September 2004, and at the tropical waters in February – March 2005.

#### Tagging

The tagging using conventional tags has been conducted by research vessels etc. opportunistically. In addition, there are some dedicated tagging programs by chartered vessels.

Also in addition to conventional tagging, there have been several studies using the archival tag and archival popup tag for tuna and tuna-like species.

For conventional tagging activity in 2004, 2,213 pacific bluefin tuna, 60 albacore, 555 bigeye, 1,973 yellowfin, 14 billfish, and 2,478 skipjack were tagged and released. There were recovery reports on 333 pacific bluefin tuna, one albacore, 8 bigeye, 9 yellowfin, and 166 skipjack. In addition, 22 pacific bluefin tuna, 36 albacore, one bigeye, and 8 yellowfin were released with an archival tag and 8 pacific bluefin tuna and 6 blue marlin and 10 striped marlin were released with an archival pop-up tag in 2004. Four albacore with the archival tag were recovered and archival popup tags of 6 pacific bluefin tuna and 3 blue marlin and 8 striped marlin sent data successfully.

#### Studies on Biological parameter

The daily increment formation on otolith was validated for bigeye by the rearing experiment of fish injected the OTC. Farther detail analyses of the otoliths obtained are under going. Trial of aging study on blue marlin has been conducted from 2003. Study on the comparison among variety of hard parts, the 5th spine of dorsal fin is supposed to be a best part for observing rings.

Double tagging experiment for juvenile bluefin tuna within a rearing net cage was conducted to estimate the natural mortality and tag shading rate. This study will be continued under different weather condition and researcher and additional information should be obtained.

Stock structure of skipjack in the Pacific ocean has been studies by the mt-DNA analysis. The existence of only one skipjack stock is suggested in the Pacific ocean so far. Additional samples from the Pacific ocean and adjacent area of the Indian ocean will be analyzed

#### Stock assessment

Japan has been working for stock assessment of various tuna and tuna-like species jointly with several organizations and nations . These studies successfully contributed to analyses of the current status of the stocks. The NRIFS is leading the stock assessment of the pacific bluefin tuna by using VPA type analysis. The Multifan-CL analysis for this species is also progressing. The stock assessment for north Pacific albacore was carried out by using VPA type analyses under the framework of the North Pacific Albacore Workshop. Stock assessment of tropical tunas (bigeye, yellowfin, and skipjack) has been conducted cooperatively with the scientists from SPC, IATTC, USA, Taiwan and others.

#### **References**

Anonymous (2004): Gyogyo yousyokugyou suisan tokei nenpou, heisei 14 nen (Yearbook of fisheries and aquaculture production statistics of Japan for 2002), Statistics Department, Ministry of agriculture, forestry and fishery, 363 pp.

Table 1. Number of Japanese tuna fishing vessels operated in the Pacific Ocean by type of fisheries and vessel size.

Year	Longline fishery *					Total	Purse seine fishery			Pole and line fishery					Total
	1-19 GRT	20-49 GRT	50-99 GRT	100-199 GRT	200- GRT		50-199** GRT	200- GRT	Total	1-19*** GRT	20-49 GRT	50-99 GRT	100-199 GRT	200- GRT	
1980	821	57	715	103	645	2,341	50	16	66	3,232	14	350	10	198	3,804
1981	774	55	706	100	661	2,296	50	23	73	3,064	10	353	6	179	3,612
1982	722	43	634	90	589	2,078	52	33	85	3,011	11	320	6	138	3,486
1983	561	38	589	93	550	1,831	59	36	95	3,021	12	297	9	116	3,455
1984	523	32	538	108	610	1,811	54	33	87	2,904	8	273	10	105	3,300
1985	620	28	512	131	628	1,919	47	35	82	2,754	8	244	9	95	3,110
1986	536	25	435	168	632	1,796	53	38	91	2,455	6	224	9	91	2,785
1987	661	23	348	197	649	1,878	47	34	81	2,404	6	210	9	89	2,718
1988	586	21	289	233	649	1,778	48	39	87	2,613	5	191	11	70	2,890
1989	650	20	248	238	653	1,809	43	37	80	2,254	3	187	12	67	2,523
1990	685	21	227	241	664	1,838	43	35	78	2,228	4	176	9	66	2,483
1991	768	19	199	222	682	1,890	38	35	73	2,277	3	166	10	63	2,519
1992	793	19	164	206	681	1,863	31	38	69	2,093	3	156	11	46	2,309
1993	790	18	138	201	682	1,829	27	36	63	1,927	3	147	10	43	2,130
1994	819	21	110	198	675	1,823	23	33	56	1,830	3	124	10	48	2,015
1995	738	20	92	187	667	1,704	20	31	51	481	3	104	20	46	654
1996	711	17	91	155	640	1,614	21	32	53	512	3	89	29	43	676
1997	698	11	88	145	631	1,573	20	35	55	436	2	76	39	45	598
1998	712	11	80	129	623	1,555	20	35	55	382	2	73	40	46	543
1999	703	6	78	119	567	1,473	22	36	58	416	2	62	54	46	580
2000	732	3	76	111	496	1,418	23	37	60	357	1	56	57	47	518
2001	777	6	76	108	494	1,461	19	36	55	285	1	49	59	47	441
2002	782	2	79	99	484	1,446	18	36	54	251	1	49	57	48	406

\* Longline vessels larger than 50 GRT include those operated in the area other than the Pacific

\*\* 50-199 GRT class vessels only include those operated in the Pacific side of northern Japan.

\*\*\* 1 – 19 GRT class vessels before 1995 include those engaged in trolling

Table 2. Catch (MT) by species and fishing effort (Number of cruising days) of longline vessels smaller than 20 GRT. There is no available effort data (fishing days) in 2002. Catch of Blue marlin includes some catch of black marlin. Other marlins represents sailfish and spearfish. Data in 2002 is provisional.

Year	Days	Bluefin	Albacore	Bigeye	Yellowfin	Swordfish	Striped marlin	Blue marlin	Other marlins	Others	Total
1980	76,281	671	2,975	2,658	5,840	824	607	702	196	8,590	23,063
1981	77,644	277	2,908	2,523	5,123	675	259	820	80	6,049	18,714
1982	81,350	512	3,674	2,904	5,117	839	270	722	60	4,970	19,068
1983	75,735	130	3,808	4,201	6,207	955	320	1,058	101	6,580	23,360
1984	73,520	85	3,351	5,168	5,968	1,141	386	1,306	83	5,935	23,423
1985	82,600	67	4,045	4,607	6,229	980	711	1,037	176	6,645	24,497
1986	80,295	72	4,712	4,475	6,199	960	901	898	191	5,720	24,128
1987	81,915	181	5,503	4,023	7,148	819	1,187	1,526	393	5,800	26,580
1988	75,224	106	5,585	5,012	7,528	665	752	1,454	106	4,830	26,038
1989	74,443	172	4,711	6,101	7,685	742	1,081	1,261	52	4,575	26,380
1990	85,010	267	6,513	7,053	7,800	687	1,125	1,204	186	4,925	29,760
1991	97,304	170	6,664	7,025	8,034	799	1,197	1,342	305	5,267	30,803
1992	99,984	428	8,036	7,302	8,452	1,173	1,247	1,657	216	5,144	33,655
1993	104,173	667	16,591	6,889	7,950	1,394	1,723	2,092	189	4,516	42,011
1994	103,538	968	16,366	5,974	6,970	1,357	1,284	1,833	177	4,390	39,319
1995	101,658	571	17,497	5,532	6,886	1,386	1,840	1,687	344	4,991	40,734
1996	102,087	778	18,627	6,067	6,257	1,063	1,836	1,332	327	4,661	40,948
1997	108,097	1158	24,926	5,442	6,079	1,400	1,213	1,023	209	4,688	46,138
1998	105,496	1086	23,403	4,846	5,888	1,975	1,186	1,147	270	5,413	45,214
1999	107,304	1030	21,219	5,805	5,500	1,551	1,047	1,063	172	4,480	41,867
2000	109,088	832	19,228	6,042	6,895	1,109	1,112	1,226	93	3,149	39,686
2001	110,638	728	17,539	5,587	5,944	1,326	899	1,215	74	4,097	37,409
2002	—	889	14,167	7,969	5,058	1,175	1,146	1,043	69	3,111	34,627



Table 3. Fishing effort (1,000 hooks) and catch (MT) by species and of the vessels greater than 20 GRT of Japanese offshore longline fishery and distant water longline fishery in the Pacific. Data in 2003 is provisional.

Upper: north of Equator, lower: south of Equator.

SBT; southern bluefin tuna, SWO; swordfish, MLS; striped marlin,

BUM; blue marlin, BLM; black marlin, SFA; sailfish and also includes spearfish

north of Equator												
Year	Hooks	Bluefin	SBT	Albacore	Bigeye	Yellowfin	SWO	MLS	BUM	BLM	SFA	Total
1980	215,102	140	0	11,623	44,651	44,827	6,005	5,871	5,613	388	532	119,650
1981	218,508	313	0	14,826	36,556	33,122	7,039	3,957	5,518	272	539	102,142
1982	200,830	206	0	12,939	44,655	28,539	6,064	5,211	6,051	206	891	104,762
1983	196,470	87	0	11,200	45,310	30,014	7,692	3,575	4,796	199	591	103,464
1984	201,106	57	0	11,604	41,347	26,402	7,177	3,335	6,248	226	337	96,733
1985	198,726	38	0	10,119	49,584	21,508	9,335	3,698	5,164	226	161	99,833
1986	189,379	30	0	8,094	48,445	24,340	8,721	5,178	5,922	124	211	101,065
1987	204,702	30	0	9,083	54,245	25,328	9,495	5,439	5,370	147	221	109,358
1988	206,674	51	0	8,976	39,193	19,880	8,574	5,768	5,054	146	293	87,935
1989	215,363	37	0	8,224	54,545	20,337	6,690	4,582	5,117	86	377	99,995
1990	198,126	42	0	9,190	55,286	22,963	5,833	2,298	4,116	75	117	99,920
1991	182,518	48	0	10,165	43,229	18,833	4,809	2,677	4,094	85	161	84,101
1992	172,732	85	0	10,735	49,136	21,688	7,234	2,757	3,720	111	128	95,594
1993	172,433	145	0	12,992	41,114	18,667	8,298	3,286	4,600	69	118	89,289
1994	157,907	239	0	13,211	35,136	15,246	7,146	2,859	4,769	101	146	78,853
1995	140,766	108	0	11,558	29,216	17,282	6,242	3,402	4,470	61	155	72,494
1996	125,077	123	0	13,813	24,921	17,211	6,916	1,951	2,357	54	103	67,449
1997	121,879	142	0	13,973	31,568	19,174	7,002	2,120	2,975	56	98	77,107
1998	114,433	169	0	12,308	32,148	11,280	6,194	1,777	2,374	56	119	66,424
1999	119,425	114	0	11,897	26,771	8,922	5,848	1,621	2,534	46	185	57,938
2000	119,497	121	0	10,753	25,914	14,332	6,136	1,128	2,503	60	133	61,080
2001	123,215	164	0	11,253	31,225	11,956	6,914	976	2,547	38	74	65,146
2002	111,060	49	0	6,669	29,867	8,489	6,169	756	2,139	59	53	54,251
2003	110,129	75	0	4,610	24,908	8,280	4,959	1,040	1,912	22	102	45,908

south of Equator												
Year	Hooks	Bluefin	SBT	Albacore	Bigeye	Yellowfin	SWO	MLS	BUM	BLM	SFA	Total
1980	173,836	40	9,344	2,552	47,044	29,019	2,850	3,178	4,404	616	544	99,591
1981	181,624	29	7,481	4,897	38,595	30,156	3,143	4,221	4,290	641	566	94,019
1982	157,652	20	3,719	4,822	38,722	28,030	2,819	4,265	4,418	666	509	87,990
1983	142,343	8	3,189	4,991	39,738	27,542	2,568	2,872	4,629	527	343	86,407
1984	134,417	22	2,315	3,598	35,958	20,882	2,311	2,007	5,510	528	340	73,471
1985	128,463	9	2,241	3,676	48,796	28,501	2,242	1,783	3,810	447	209	91,714
1986	166,820	14	2,120	4,462	68,939	23,304	2,971	2,371	4,922	398	257	109,758
1987	181,925	33	2,578	4,102	61,012	15,674	3,287	3,544	5,799	397	288	96,714
1988	192,599	30	1,988	6,914	48,875	26,181	4,785	2,918	4,541	588	346	97,166
1989	154,450	32	4,091	4,890	40,469	20,926	2,931	3,346	3,060	238	279	80,262
1990	171,203	27	4,591	5,319	60,057	29,707	3,493	3,079	2,942	169	306	109,690
1991	188,112	20	2,525	4,633	57,313	20,909	3,559	2,471	3,588	143	238	95,399
1992	173,568	16	2,779	5,162	52,787	17,400	5,862	2,411	4,686	200	319	91,622
1993	151,422	10	2,394	8,168	39,498	21,465	3,827	2,602	4,362	251	203	82,780
1994	164,015	20	1,668	8,840	40,974	31,777	3,908	2,899	6,523	338	287	97,234
1995	131,169	10	1,080	7,331	31,270	22,990	3,065	2,415	4,962	232	209	73,564
1996	106,626	9	1,128	4,538	26,080	16,556	3,142	2,530	2,302	136	218	56,639
1997	96,029	12	936	4,797	27,150	14,707	3,766	2,673	3,171	117	243	57,574
1998	107,082	10	1,013	7,778	26,111	11,817	3,690	2,709	2,945	168	271	56,513
1999	72,057	17	1,747	3,814	13,238	6,829	2,161	1,175	1,341	58	216	30,596
2000	78,827	7	1,100	2,843	21,427	19,371	1,961	682	1,437	69	258	49,155
2001	95,902	6	1,668	4,855	26,601	13,949	3,072	1,203	1,489	56	328	53,227
2002	105,109	4	1,814	5,276	25,052	10,743	2,876	1,066	1,489	67	327	48,715
2003	105,247	13	2,061	4,740	17,395	12,447	2,746	1,134	1,575	68	299	42,478

Table 4. Fishing effort (Number of set) and catch (MT) by species of the Japanese purse seine fisheries in the Pacific.

Upper; north of 20N, lower; south of 20N

Area north of 20 N Pacific								
Year	Set	Skipjack	Yellowfin	Bigeye	Bluefin	Albacore	Others	Total
1980	3,053	17,428	10,469	173	10,222	301	1,450	40,043
1981	2,620	7,586	5,809	142	22,761	49	1,984	38,331
1982	2,696	5,141	2,314	148	15,334	282	1,035	24,254
1983	2,585	7,203	4,639	232	13,196	220	1,195	26,685
1984	3,747	18,900	7,786	234	3,145	2,986	1,264	34,315
1985	3,578	15,616	13,189	629	3,774	1,395	2,463	37,066
1986	4,260	22,414	4,743	616	5,865	1,122	1,669	36,429
1987	4,016	27,010	4,241	470	8,101	1,216	2,148	43,186
1988	3,009	42,465	4,609	248	2,800	1,157	900	52,179
1989	2,669	17,552	7,442	577	5,374	1,889	856	33,690
1990	2,050	12,910	6,544	540	2,382	1,798	1,563	25,737
1991	2,049	25,325	3,872	766	3,632	3,239	1,329	38,163
1992	1,996	14,303	6,021	567	2,679	4,475	1,251	29,296
1993	2,141	40,771	3,514	975	2,883	1,657	170	49,970
1994	1,706	30,612	2,222	956	5,429	2,138	2,346	43,703
1995	2,193	28,995	5,667	1,157	7,968	1,103	5,398	50,288
1996	1,605	16,503	3,966	728	5,672	256	263	27,388
1997	2,765	71,020	4,019	925	9,285	1,101	2,306	88,656
1998	2,857	95,850	2,883	416	1,930	983	1,226	103,288
1999	2,625	30,944	6,559	755	12,107	6,444	1,682	58,490
2000	2,928	34,076	4,781	1,067	14,183	2,161	3,076	59,343
2001	2,492	45,758	2,549	801	5,892	979	3,285	59,263
2002	2,443	39,956	2,289	963	7,422	3,072	2,670	56,370
2003	3,020	57,937	3,481	1,341	5,321	837	1,603	70,520

Area south of 20 N Pacific								
Year	Set	Skipjack	Yellowfin	Bigeye	Bluefin	Albacore	Others	Total
1980	1,858	31,391	9,607	391	0	0	234	41,623
1981	3,045	37,178	21,725	783	0	0	212	59,898
1982	4,678	69,965	28,774	982	0	0	626	100,347
1983	5,655	109,829	26,192	1,236	0	0	215	137,472
1984	7,293	110,055	30,866	469	0	0	53	141,443
1985	6,981	103,677	34,758	751	0	0	84	139,270
1986	5,792	108,486	39,724	915	0	0	52	149,177
1987	5,703	88,495	40,392	1,132	0	0	103	130,122
1988	6,682	141,118	25,510	358	0	0	149	167,135
1989	6,905	104,478	33,431	952	0	0	64	138,925
1990	6,207	127,206	31,198	1,583	0	0	318	160,305
1991	6,024	124,642	44,642	1,185	0	0	41	170,510
1992	5,404	125,869	47,067	1,996	0	0	475	175,407
1993	6,333	96,302	54,381	928	0	0	329	151,940
1994	4,870	129,539	37,644	720	0	0	91	167,994
1995	5,478	114,188	39,494	482	0	0	6	154,170
1996	6,047	137,442	19,318	690	0	0	25	157,475
1997	4,894	85,864	53,413	7,548	0	0	15	146,840
1998	4,644	134,510	34,902	2,294	0	0	1	171,708
1999	4,087	119,376	37,289	2,769	0	0	10	159,443
2000	4,357	133,650	31,344	3,669	0	0	120	168,783
2001	3,851	123,570	31,186	5,324	3	0	5	160,088
2002	4,000	148,097	16,849	3,624	0	0	5	168,575
2003	4,459	129,386	23,639	3,758	98	0	0	156,881

Table 5. Fishing effort (Number of poles • days) and catch (MT) by species and of Japanese offshore and distant water pole and line fisheries in the Pacific. Upper; north of 20N, lower; south of 20N

Area north of 20 N Pacific								
Year	Poles • Days	Skipjack	Albacore	Yellowfin	Bluefin	Bigeye	Others	Total
1980	794,962	127,985	43,007	4,654	671	1,511	2,151	179,979
1981	692,719	73,633	25,589	7,025	220	1,795	3,180	111,442
1982	682,330	94,186	28,817	6,970	134	2,698	3,059	135,864
1983	602,921	103,999	19,591	7,870	43	3,103	3,115	137,721
1984	588,193	162,917	25,892	7,444	217	2,863	1,833	201,166
1985	491,964	73,697	21,036	8,647	232	3,344	2,876	109,832
1986	480,392	130,433	13,813	7,416	158	2,266	1,835	155,921
1987	444,438	87,160	19,045	7,506	607	2,571	2,139	119,028
1988	362,446	97,290	7,126	7,436	224	3,449	1,993	117,518
1989	358,053	87,300	10,905	8,070	207	3,485	2,174	112,141
1990	368,007	77,451	13,815	5,733	56	3,172	3,774	104,001
1991	276,549	101,683	6,469	4,424	198	1,189	2,038	116,001
1992	297,999	88,737	14,856	5,340	140	976	2,789	112,838
1993	277,969	127,180	12,459	3,933	34	1,695	1,025	146,326
1994	263,710	74,037	30,275	3,753	107	1,837	691	110,700
1995	271,971	94,712	22,826	4,124	395	2,462	1,187	125,706
1996	234,668	57,234	22,305	4,731	52	2,489	524	87,335
1997	298,889	92,159	34,836	3,520	177	2,516	689	133,897
1998	283,587	85,920	27,650	2,899	606	1,313	1,228	119,616
1999	324,148	91,040	54,855	3,411	58	1,048	605	151,017
2000	346,220	111,844	21,468	3,396	88	1,763	287	138,846
2001	325,666	66,623	29,195	2,541	725	1,305	461	100,850
2002	305,812	56,699	49,446	2,446	92	1,682	419	110,784
2003	321,637	89,415	34,572	1,968	9	769	14	126,747

Area south of 20 N Pacific								
Year	Poles • Days	Skipjack	Albacore	Yellowfin	Bluefin	Bigeye	Others	Total
1980	421,666	109,548	14	1,573	5	518	262	111,920
1981	547,796	127,191	10	2,030	10	543	250	130,034
1982	437,296	105,978	5	2,529	1	1,111	752	110,376
1983	333,133	120,530	5	1,468	0	669	497	123,169
1984	292,994	121,577	28	1,258	1	349	158	123,371
1985	296,158	85,477	3	4,278	0	637	239	90,634
1986	245,295	103,291	7	994	1	253	136	104,682
1987	248,177	90,357	9	948	1	245	223	91,783
1988	219,971	103,714	4	693	0	211	165	104,787
1989	204,598	96,837	13	1,076	4	86	100	98,116
1990	152,525	44,940	4	1,237	0	159	114	46,454
1991	67,981	49,654	0	980	2	43	31	50,710
1992	60,786	29,911	0	1,564	0	52	488	32,015
1993	98,889	35,222	12	595	0	74	52	35,955
1994	83,902	34,907	3	282	0	71	13	35,276
1995	89,750	37,907	2	403	0	165	43	38,520
1996	111,214	40,682	60	151	1	60	12	40,966
1997	75,122	30,340	14	207	0	68	13	30,642
1998	96,303	38,271	39	163	0	39	25	38,537
1999	85,527	31,250	101	235	0	49	10	31,645
2000	81,920	27,016	33	79	0	29	8	27,165
2001	82,417	29,521	30	74	0	16	5	29,646
2002	88,067	33,923	11	54	0	33	3	34,024
2003	74,285	27,356	7	124	0	60	0	27,547

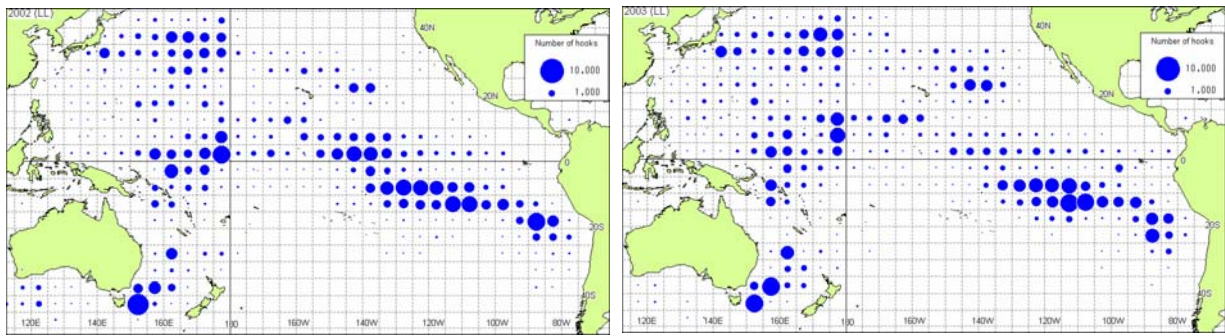


Figure 1. Distribution of fishing effort (Number of hooks) for the Japanese longline fishery (offshore and distant water) in the Pacific. Left; 2002, Right; 2003

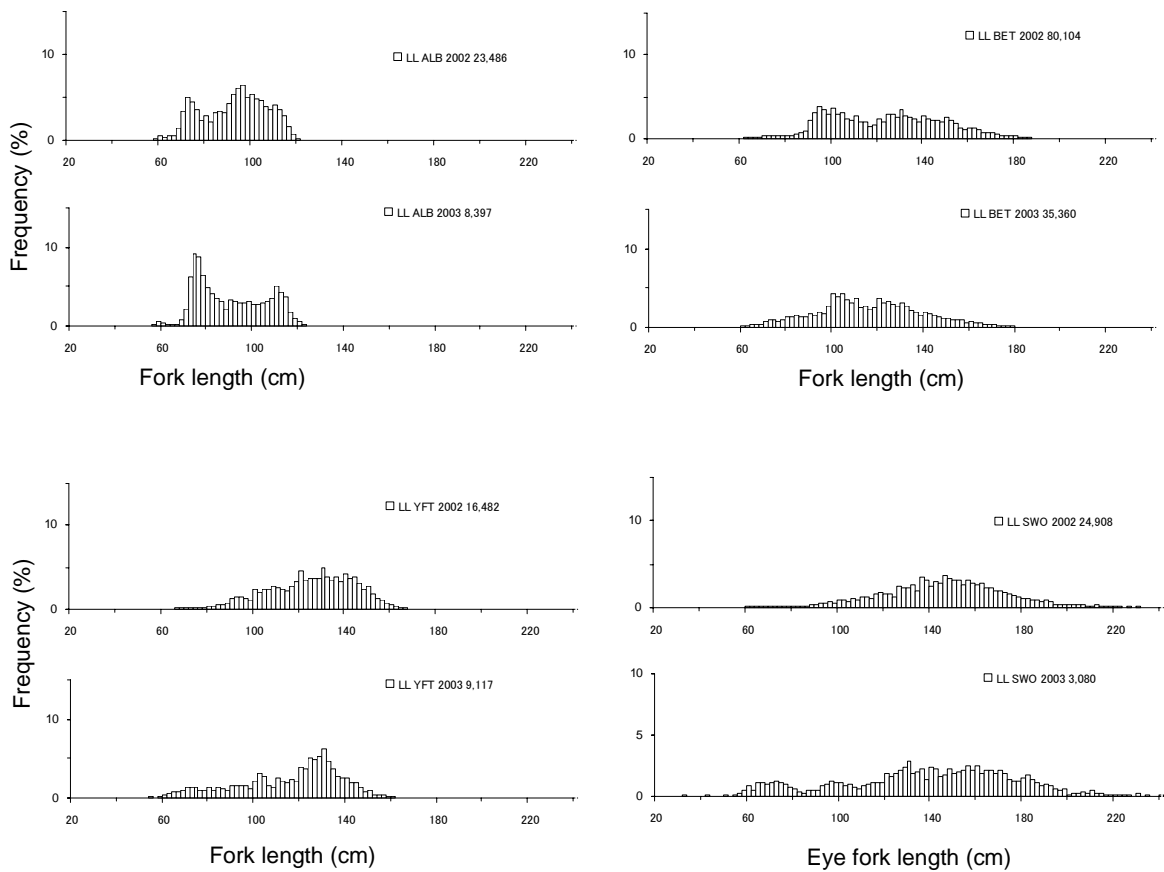


Figure 2. Annual length frequency distribution for offshore and distant water longline caught albacore (top left), bigeye (top right), yellowfin (bottom left), and swordfish (bottom right) in 2002 and 2003. Text following □ indicates gear, species, year, and number of fish measured.

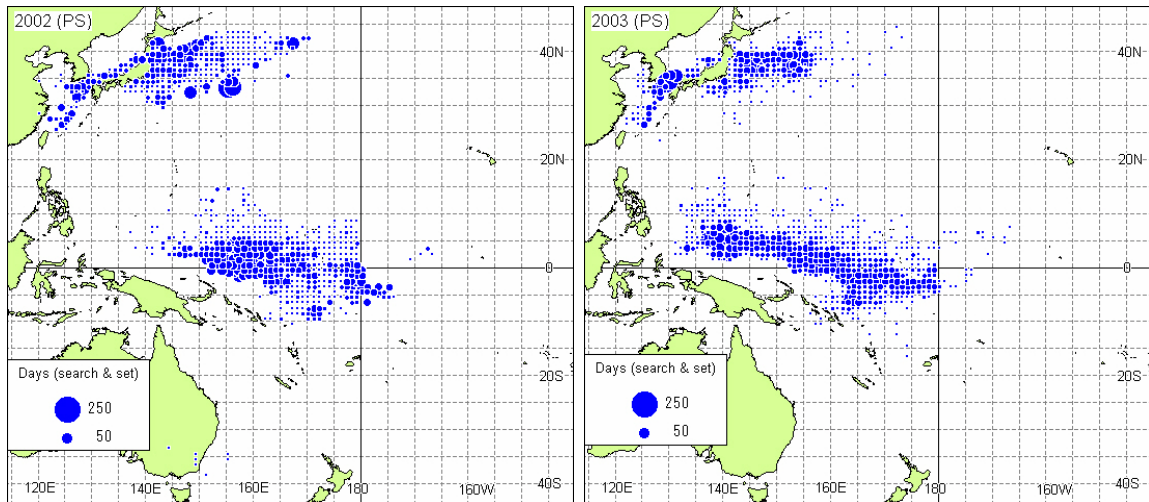


Figure 3. Distribution of fishing effort for the Japanese purse seine fishery in the Pacific. Left; 2002, Right; 2003

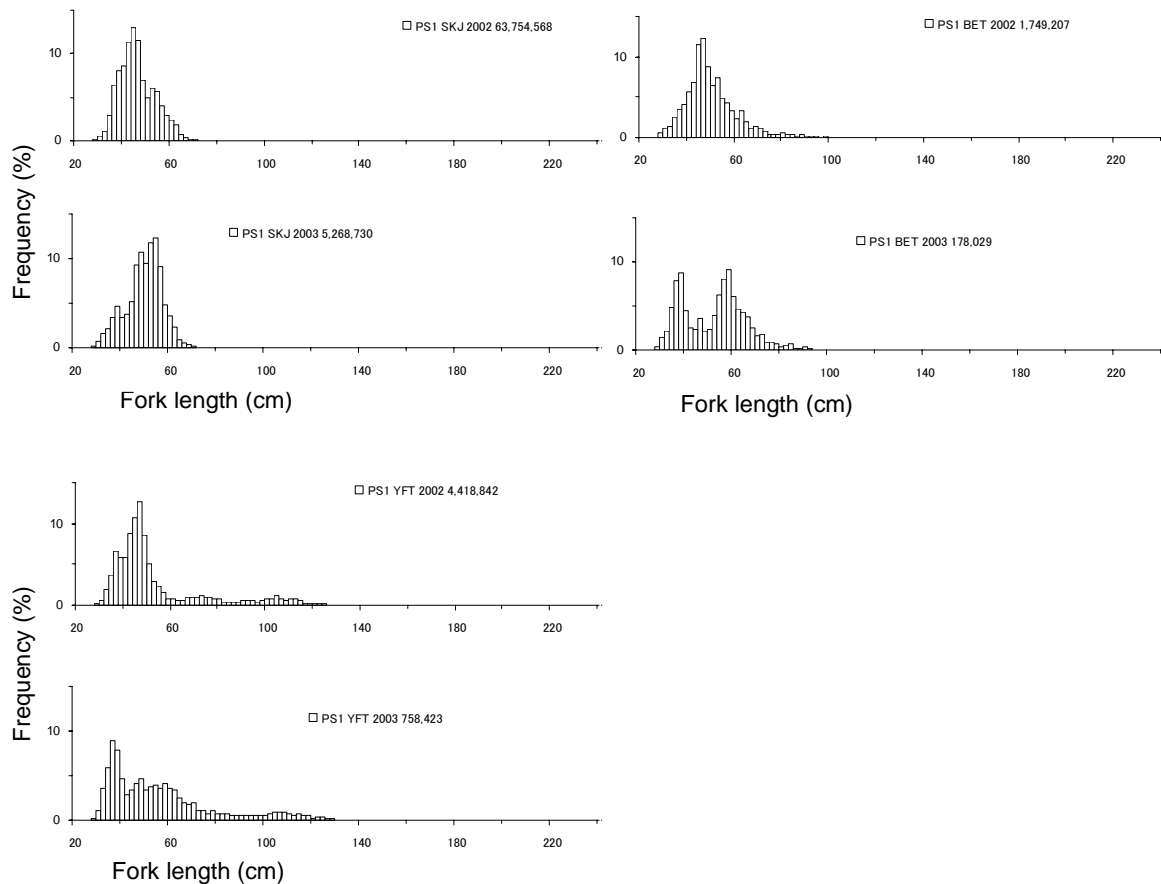


Figure 4. Annual length frequency distribution for distant water purse seine caught skipjack (upper left), bigeye (upper right), and yellowfin (bottom) in 2002 and 2003. Text following  $\square$  indicates gear, species, year, and estimated number of fish caught

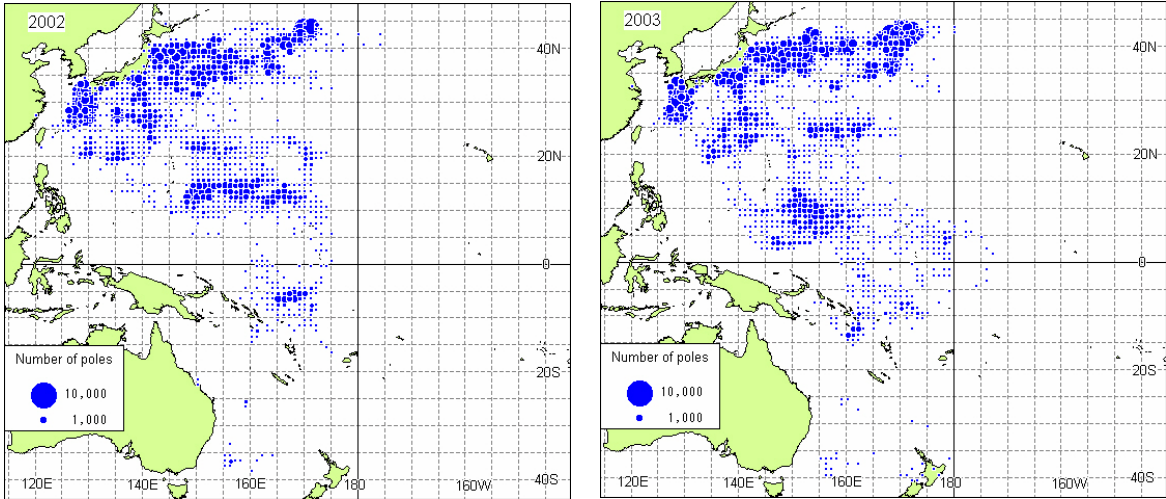


Figure 5. Distribution of fishing effort (number of poles·days) of the Japanese pole and line fishery in the Pacific. Left; 2002, Right; 2003

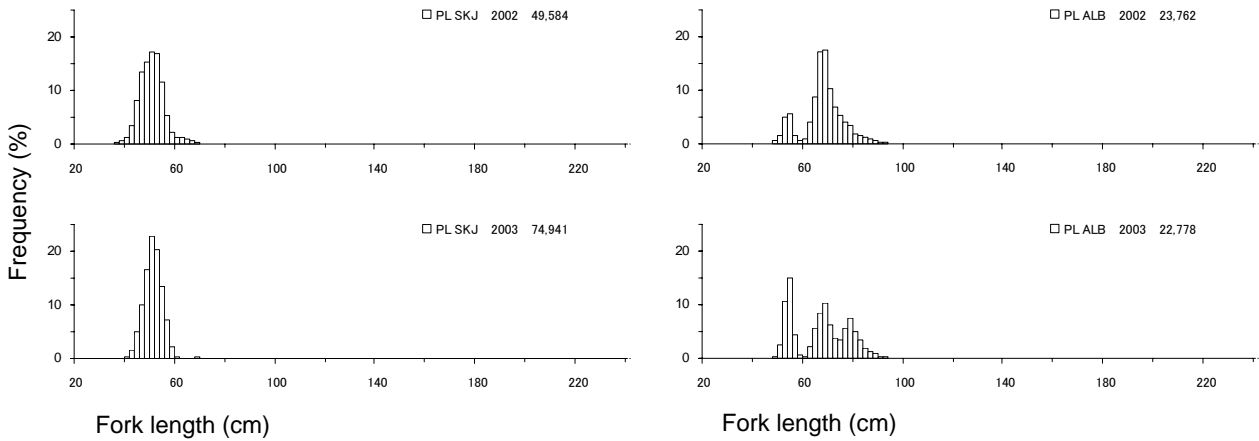


Figure 6. Annual length frequency distribution for offshore and distant water pole and line caught skipjack (left) and albacore in 2002 and 2003. Text following  $\square$  indicates gear, species, year, and number of fish measured.