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National Report of Japan [1]

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The total landing of tunas (excluding skipjack) caught by Japanese fisheries in the Pacific Ocean in 2005 was 168,000 metric ton (t) and the total landing of swordfish and billfishes (striped marlin, blue marlin and black marlin) was 18,000 t. The landing of skipjack tuna was 357,000 t. Japanese tuna fisheries consist of the three major fisheries, i.e., longline, purse seine, pole-and-line, and other miscellaneous fisheries like troll, drift-net, set-net fisheries. These fisheries occupy around 90 % of the total tuna catch of Japanese fisheries in recent years. This paper described the recent trend of the Japanese tuna fisheries in the Pacific Ocean and updated the statistics given in the previous national report for ISC6 (Uosaki 2006). Also there was a brief description on Japanese research activities on tuna and tuna-like species in the Pacific Ocean in 2006 and early 2007.

1. Trends in fleet size

Table 1 shows the number of Japanese tuna vessels actually engaged in fishing by type of fishery and vessel size class during 1980-2005 (Anonymous 1982-2007). The total number of longline vessels in 2005 was 1,233. The number of longline vessels of the largest size class (larger than 200 Gross Register Tonnage (GRT)) had been near constant since the late 1960s. But according to the agreement at the FAO's international action plan on fishing capacity, it decreased 20% from 1998 to 2000, and then it declined furthermore. The number of the vessels for 20-49 GRT and 50-100 GRT showed sharp declines since the late 1980s. As an information for the late 2005 and after, these declining trend has been accelerated by the further slowdown of economic surrounding longline fishing (high fuel cost, low price of tuna, high supply of tuna from the foreign fisheries and low catches due to the decline of stock size). Many longline operators went bankrupt and many vessels are now tied up at the home port.

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 53 in 2005, it was nearly 80% in the 1980s. The number of the smaller size (smaller than 200 GRT) purse seine vessels has decreased since the late 1980s, the larger vessels which operate mainly in the tropical waters 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 was 140 in 2005 corresponding to almost one third of those in the 1980s. The trend in the number of vessels smaller than 20 GRT is difficult to follow the long-term trend, but it declined to less than a half in 2005 even since 1995.

2. Catch and effort trends of the 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). The data source of catch and effort for the coastal longline and pole-and-line fisheries are derived from Statistics Department, Ministry of Agriculture, Forestry and Fishery (Anonymous 1982-2006).

2.1. Longline

Longline fisheries had been classified by vessel size into three categories in terms of the license of tuna fishery, i.e., coastal (vessels smaller than 20 GRT), offshore (20-120 GRT), and distant water (larger than 120 GRT) until 2001. Since the categorization on the license was changed in 2002, tuna vessels of 10–20 GRT

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operating outside the Japanese EEZ were categorized as offshore license. Latest available statistics are provisional 2005 data for both vessels larger and less than 20 GRT.

Total days at sea of longline vessels less than 20 GRT have gradually increased since 1990 (Table 2). The effort in 2005 was 110,000 days which was a 50 % increase from that in 1980. Total catch of these vessels ranged from about 21,000 to 36,000 t in the last decade, and albacore is the largest portion corresponding to about a half of the total catch. Albacore catch has increased remarkably since 1993 and peaked at 25,000 t in 1997, but decreased to 12,000 t in 2005.

Total catch of longline vessels larger than 20 GRT (offshore and distant water fisheries) in the entire Pacific were 78,000 t in 2005 (Table 3). In the North Pacific (north of the equator), 100 million hooks were employed and 45,000 t of tunas and billfishes was caught in 2005. In the South Pacific, the fishing effort was 74 million hooks and the catch was 33,000 t in 2005. Bigeye has been the dominant species for both the North and the South Pacific and the catch in 2005 were 23,000 t in the North Pacific and 14,000 t in the South Pacific.

The fishing effort of longline vessels larger than 20 GRT remained stable at around 200 million hooks in the North Pacific until the early 1990s, and then it has decreased to 100 million hooks up to the recent years. The similar declining trend was seen in the South Pacific. Catch of bigeye, yellowfin and marlins in both the North and the South Pacific had been stable in the 1980s, but it shows the decreasing trend in the 1990s and after. Catches of Pacific bluefin tuna and albacore in the North Pacific showed some drops during the mid 1980s and a recovery in the early 1990s, and then a declining trend again, though the bluefin catch showed a increase in 2004 and 2005. The catch of swordfish appears to be relatively stable.

The catch and effort by the Japanese distant water longline fishery are likely to decrease due to the economic circumstances (i.e. high fuel cost, low price of tuna). As large part of these vessels have operated in the waters other than the North Pacific (more than 80%) such as south-east Pacific, Indian Ocean and Atlantic Ocean, the decline likely to be larger in those waters.

Annual distribution of fishing effort for longline vessels larger than 20 GRT in 2004 and 2005 are shown in Figure 1. The fishing grounds are located in east-west direction off Japan to Hawaii, equatorial area between 15 ˚S and 15 ˚N, off Australia and off Peru.

Length distribution for tunas and swordfish caught in the Pacific, which was measured on board or at landing port, is shown in Fig. 2. The length of albacore ranged from 60 to 120 cm in fork length (FL). The length of bigeye and yellowfin had wider ranges approximately from 60 to 180 cm but fish larger than 90 cm formed a dominant part of the catch. The length of the swordfish measured ranged from 50 to 220 cm in eye-fork length.

2.2. 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 consists of one net purse seiner (100-200 GRT) and one searching vessel and two carrier vessels, and operates in the temperate northwestern Pacific. New type of group seiner launched at March 2005, which consist of one relatively large seiner (300 GRT) than typical size of the purse seiner and one carrier decreased from two carriers. The group purse seiner corresponds to the offshore purse seine fishery. The carrier holds fish in chilled water with ice. On the other hand, the single purse seiner (349-500 GRT) operates mainly in the tropical waters of the central and western Pacific, but seasonally operates in the temperate waters. This type of purse seine fishery is so called the distant water purse seine fishery.

Annual distribution of fishing effort (Figure 3) showed that the fishing ground was well divided by latitude 20 ˚N into the northern temperate waters around Japan and the tropical waters. In the northern area, the number of sets was large at about 3,500-4,000 sets in the mid 1980s, decreased to about 2,000 sets during the late 1980s, and then recovered in 1998 and remained at about 2,500-3,400 sets in recent years. In the southern area, the number of sets peaked at 7,000 set in 1984 then gradually decreased to around 4,000 sets until the early 2000s

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(Table 4). Total catch in the northern area varied from 23,000 to 102,000 t in the 1980s and after. The skipjack catch dominate among species in this area followed by yellowfin and Pacific bluefin, but the catch of each species has been fluctuated. The skipjack catch in 1998 in this area was highest in the history, resulting in 96,000 t in total catch.

In the southern tropical waters, number of fishing effort increased rapidly until 1983 and then it was leveled off. Total catch in the southern area were stable at around 150,000 t or more after the mid 1980s. Skipjack occupies most of the catch followed by yellowfin and bigeye.

The length of skipjack caught by the purse seine fishery in the southern area ranges from 30 to 70 cm in FL and bigeye ranges from 30 to 90 cm (Figure 4). Most of the catch of yellowfin is also in the range from 30 to 60cm but there are some fish in FL larger than 80 cm.

2.3. Pole-and-line

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 (lager than 120 GRT) vessels in terms of the license of this fishery. The pole-and-line fishery can be also categorized into large, middle, and small (sized) vessels which correspond to larger than 230 GRT, 20-230 GRT and less than 20 GRT in vessel size. This categorization is useful to discriminate between those fisheries in terms of fishing ground and fishing strategy.

The middle-sized vessels generally operate in near shore waters and their trip is within 10 days. Southern most fishing area for these vessels, in recent years, is near 15˚N, but the important fishing ground is waters north of 25˚N around Japan and adjacent areas. These vessels primarily fish skipjack tuna from spring through autumn off Pacific side of Japan, and also take relatively small amount of albacore, yellowfin and bigeye. They hold fish in cooled water and unload it as fresh fish. The activity of the small pole-and-line vessels is more or less similar to that of the middle vessels but the area of fishing is limited to the coastal waters of Japan.

On the contrary, the large vessels operate much more offshore waters and their trips are for two or three months. Usually they primarily fish for albacore from summer through autumn season in the waters north of 20˚N, and skipjack tuna in winter and spring in the waters south of 20˚N. These vessels equip a brine freezer, in which fish caught is immediately stored into a tank filled with cooled brine, and then unloads it as frozen fish.

Fishing grounds of the pole-and-line fishery are separated by approximate 20˚N (Figure 5) as the case of purse seine fishery. For both areas divided by 20˚N, fishing effort has been decreasing, especially for the southern area (Table 5). The fishing effort in 2005 was 302,000 poles-days, 39 % of 1980 for the northern area and was 66,000 poles-days, 16 % of 1980 for the southern area. Despite the substantial reduction of the fishing effort, the catch of skipjack and albacore in the northern area appears to be relatively stable. In the northern area, recent catches were variable, 60,000 to 110,000 t for skipjack, and 20,000 to 50,000 t for albacore. Skipjack and yellowfin catches in the southern area, by the large pole-and-line vessels, showed steep declines reflecting the concomitant reduction of the fishing effort during the 1980s.

Annual catch by the coastal pole-and-line fishery is 10,000 t or less and minor compared with that of the offshore and distant water pole-and-line fisheries.

The lengths of skipjack caught by this fishery are from 40 to 60 cm FL and albacore are from 50 to 90 cm with several clear modes (Figure 6).

2.4. 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 2004 of about 6,200 t for tunas and 15,000 t for skipjack (Anonymous 2006).

The large mesh driftnet 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

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Pacific in 1992 due to UN resolution implemented for large scaled drift gillnet fishery in the high seas.

2.5. Recent developments and trends of Pacific bluefin tuna, albacore and swordfish fisheries

Total catch of Pacific bluefin in Japan have been around 13,000 t after 2000 (Yamada 2007). The catch in 2005 sharply increased 21,000 t from 13,000 t in the preceding year, and then the total catch was down to 13,000 t in 2006. Purse seine catch is the largest portion among gears and their catch was 7,100 t in 2006 corresponding to the average level in the last 5 years. The longline catch had increased to 1,800 t in 2005 since 2002, though it decreased 1,000 t in 2006. The annual troll catch has been fluctuated between 1,700 – 4,400 t since 2000, and the catch in 2006 seems to be lower level in recent years. The troll fishery supplies fish not only for local market but also for the fattening. Catch amount used for fattening is likely to be around 10-20 t.

The catches of North Pacific albacore are mainly made by the longline and the pole-and-line fisheries. The pole-and-line catch was 16,177 t in 2005 (Table 5), and the catch in 2006 was about 16,839 t according to the information of albacore landing in major fishing ports, corresponding to about 104% in 2005 and stayed at the lowest level in the last decade. One reason of this low catch in 2006 was due to decreasing substantial number of the large pole-and-line vessels engaged in this year for economical circumstance. The albacore catch by longline (total of less and larger than 20 GRT) in the North Pacific was 17,460 t in 2005 (Tables 2 and 3) corresponding to 114% of 15,372 t in 2004.

Swordfish catch by the offshore and the distant water longliners in 2005 (5,714 t) in the North Pacific was 9 % increase from that in 2004. This is mainly due to the increase of the catch of offshore surface longliners targeting swordfish. In 2006, relatively good catch of swordfish was observed in compare to that in 2005.

3. Compilation of basic fisheries data

There are logbook systems for offshore and distant water longline, pole-and-line, and purse seine fisheries. From 1994, 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. Historical Category II data was compiled from those logbook data and submitted to the ISC Statistic Working Group in July 2007.

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 catches are covered by the landing statistics collected by the Statistics Department of the Ministry of Agriculture, Forestry and Fisheries (Anonymous 1982-2005). The Fishery Agency of Japan, in cooperation with the NRIFSF and local prefectural fisheries experimental stations, has run the nationwide port sampling project for catch, effort and size data for various fisheries at the major landing ports since the mid 1990s.

4. 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.

4.1. Research cruises in 2006 and 2007

There have been research cruises in 2006 conducted by the Fisheries Agency of Japan and NRIFSF relating to tunas and billfish in the Pacific, in addition to the several short cruises for tagging.

A research cruise on diurnal movement and migration pattern of bigeye and blue marlin was conducted by the

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R/V Shoyo-maru of the Fisheries Agency of Japan during September to December 2006 in the temperate and tropical area of central and western Pacific Ocean. In this cruise, Popup Archival Tag (PAT) were attached to 14 bigeyes and released. In them, 7 PATs were popped up shortly in a week, and remained tags were popped up after 17 – 72 days after released. Besides the tagging study, biological observation and sampling was made on the all individuals caught, and relationship between fishing gear shape under water and Oceanographic conditions was observed. Two research cruises for tuna larvae and early juveniles were conducted by using a plankton net and a mid-water trawl gear. The purpose of one cruise was to study distributions of larvae and early juvenile for skipjack in the tropical waters during February to March. The other one was for bluefin and yellowfin larvae at the vicinity of Nansei-Islands during May to July 2006 to investigate both of distribution of larvae and early juvenile and survival process in the larval patches.

To develop mitigation measures for reducing incidental mortality of sea turtles and seabirds in longline fishery, experimental fishing operations were conducted in the western North Pacific from April to June, 2006 and 2007 by using the R/V Kurosaki and RV Taikei No.2. Mitigation effectiveness and practical feasibility of circle hooks, tori-line, and side-setting were examined in these experiments.

4.2. Tagging

The tagging using conventional tag has been conducted by research vessels as well as commercial vessels. Some of these are not dedicated tagging. In addition to the conventional tagging, tagging using the archival tag and archival popup tag has been conducted for tuna and tuna-like species.

For conventional tagging activity in 2006, 1,455 bluefin tuna, 326 bigeye, 1,137 yellowfin and 1,284 skipjack were tagged and released. There were recovery reports of 81 bluefin, 13 bigeye, 17 yellowfin, and 144 skipjack. In addition to conventional tagging, 7 Pacific bluefin tuna, 17 bigeye, and one yellowfin were tagged with an archival tag and released. Of those, 3 bigeye were recovered.

4.3. Studies on biological parameter

Following is the studies on biological parameters recently carried out by the NRIFSF.

- Study on age determination and growth of Pacific bluefin have started with focusing on larger fish in collaboration with National Taiwan University.
- Growth curve of age 0 skipjack was estimated by daily increments with using otolith. The result shows that skipjack reaches 40 – 50 cm at age 1.
- The ovaries of skipjack caught by purse seine in the tropical region were histological observed. The results indicate that almost mature skipjack females spawn one night all the year round and they do not have an annual reproductive cycle.

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

	Longline fishery[*1]						Purse seine fishery			Pole-and-line fishery					
Year	1-19 GRT	20-49 GRT	50-99 GRT	100-199 GRT	200- GRT	Total	50-199 GRT[*2]	200- GRT	Total	1-19 GRT[*3]	20-49 GRT	50-99 GRT	100-199 GRT	200- GRT	Total
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	1	62	54	46	579
2000	732	3	76	111	496	1,418	23	37	60	357	1	56	57	47	518
2001	777	4	76	110	494	1,461	19	36	55	285	1	49	59	47	441
2002	780	4	69	110	484	1,447	18	36	54	251	1	45	58	48	403
2003	764	3	64	99	460	1,390	17	36	53	292	1	44	56	44	437
2004	702	2	55	77	455	1,291	17	36	53	284	1	38	57	43	423
2005	694	2	46	59	432	1,233	17	36	53	180	1	36	58	45	320

[*1] Longline vessels larger than 50 GRT include those operated in the area other than the Pacific
[*2] 50-199 GRT class vessels only include those operated in the Pacific side of northern Japan.
[*3] 1–19 GRT class vessels before 1995 include those engaged in trolling

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Table 2. Catch in weight (t) by species and fishing effort (Number of days at sea) of longline vessels smaller than 20 GRT. Catch of Blue marlin includes some catch of black marlin. The values in this table are derived from Anonymous (1982-2003) for years 1980 to 2001. The values of the catch by species for 2002 and after were estimated from both Anonymous (2004-2005) and the logbook data. PBF: Pacific bluefin, ALB: albacore, BET: bigeye, YFT: yellowfin, SWO: swordfish, MLS: striped marlin, BUM: blue marlin, BIL: the other marlins. Data in 2005 is provisional.

Year	Days	PBF	ALB	BET	YFT	SWO	MLS	BUM	BIL	Total
1980	76,281	671	2,975	2,658	5,840	824	607	702	196	14,473
1981	77,644	277	2,908	2,523	5,123	675	259	820	80	12,665
1982	81,350	512	3,674	2,904	5,117	839	270	722	60	14,098
1983	75,735	130	3,808	4,201	6,207	955	320	1,058	101	16,780
1984	73,520	85	3,351	5,168	5,968	1,141	386	1,306	83	17,488
1985	82,600	67	4,045	4,607	6,229	980	711	1,037	176	17,852
1986	80,295	72	4,712	4,475	6,199	960	901	898	191	18,408
1987	81,915	181	5,503	4,023	7,148	819	1,187	1,526	393	20,780
1988	75,224	106	5,585	5,012	7,528	665	752	1,454	106	21,208
1989	74,443	172	4,711	6,101	7,685	742	1,081	1,261	52	21,805
1990	85,010	267	6,513	7,053	7,800	687	1,125	1,204	186	24,835
1991	97,304	170	6,664	7,025	8,034	799	1,197	1,342	305	25,536
1992	99,984	428	8,036	7,302	8,452	1,173	1,247	1,657	216	28,511
1993	104,173	667	16,591	6,889	7,950	1,394	1,723	2,092	189	37,495
1994	103,538	968	16,366	5,974	6,970	1,357	1,284	1,833	177	34,929
1995	101,658	571	17,497	5,532	6,886	1,386	1,840	1,687	344	35,743
1996	102,087	778	18,627	6,067	6,257	1,063	1,836	1,332	327	36,287
1997	108,097	1,158	24,926	5,442	6,079	1,213	1,400	1,023	209	41,450
1998	105,496	1,086	23,403	4,846	5,888	1,186	1,975	1,147	270	39,801
1999	107,304	1,030	21,219	5,805	5,500	1,047	1,551	1,063	172	37,387
2000	109,088	832	19,228	6,042	6,895	1,112	1,109	1,226	93	36,537
2001	110,638	728	17,539	5,587	5,944	899	1,326	1,215	74	33,312
2002	113,788	838	7,590	6,565	3,936	956	796	915	43	21,639
2003	114,344	1,154	15,030	8,341	6,356	1,052	836	1,218	35	34,023
2004	110,543	1,674	10,979	8,431	5,717	1,490	987	1,428	35	30,741
2005	110,543	1,802	11,520	8,170	5,267	1,180	608	999	22	29,568

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Table 3. Fishing effort (1,000 hooks) and catch in weight (t) by species for the vessels greater than 20 GRT of Japanese offshore longline fishery and distant water longline fishery in the Pacific. Data in 2005 is provisional. PBF: Pacific bluefin, SBF: southern bluefin, ALB: albacore, BET: bigeye, YFT: yellowfin, SWO: swordfish, MLS: striped marlin, BUM: blue marlin, BLM: Black marlin, SFA: sailfish and also includes spearfish

North Pacific (north of the equator)

	Hooks	PBF	SBF	ALB	BET	YFT	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	238	0	13,199	37,738	16,510	7,366	2,911	4,715	99	214	82,990
1995	140,766	107	0	11,553	31,362	18,900	6,422	3,494	4,423	60	243	76,564
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	77,108
1998	119,921	169	0	12,352	34,806	12,812	6,233	1,784	2,448	60	119	70,783
1999	130,340	127	0	12,120	31,230	11,462	5,557	1,608	2,751	50	182	65,087
2000	121,093	121	0	10,767	26,450	14,492	6,180	1,152	2,552	61	153	61,928
2001	123,799	63	0	11,262	31,474	11,974	6,932	985	2,554	37	75	65,356
2002	112,469	47	0	6,667	30,584	8,713	6,230	764	2,242	59	60	55,366
2003	105,503	84	0	4,571	23,665	7,646	5,352	1,008	1,961	27	116	44,430
2004	96,610	235	0	4,393	24,466	6,462	5,263	701	1,929	23	72	43,544
2005	99,623	149	0	5,940	23,407	7,299	5,714	654	1,869	34	101	45,167

South Pacific

Year	Hooks	PBF	SBF	ALB	BET	YFT	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	2,119	4,462	68,939	23,304	2,971	2,371	4,922	398	257	109,757
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	43,653	34,267	4,029	2,837	6,419	333	369	102,435
1995	131,169	10	1,080	7,333	33,479	25,100	3,152	2,350	4,894	228	278	77,904
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	57,572
1998	108,544	10	1,012	7,830	26,759	12,267	3,694	2,709	2,974	171	271	57,697
1999	72,100	17	1,747	3,872	13,236	6,902	2,148	1,157	1,337	57	212	30,685
2000	81,392	7	1,155	3,004	21,961	19,731	2,018	709	1,473	71	266	50,395
2001	97,087	6	1,689	4,929	26,905	14,067	3,100	1,217	1,508	57	330	53,808
2002	107,555	5	1,918	5,460	25,766	10,912	2,994	1,069	1,547	70	340	50,081
2003	103,900	13	1,897	4,357	18,240	11,380	2,732	1,018	1,741	65	303	41,746
2004	81,046	9	1,172	5,580	16,680	9,584	2,239	698	1,472	57	223	37,714
2005	74,065	16	854	7,177	13,518	7,434	1,759	721	1,387	77	359	33,302

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Table 4. Fishing effort (Number of set) and catch in weight (t) by species of the Japanese purse seine fisheries in the Pacific. SKJ: skipjack, YFT: yellowfin, BET: bigeye, PBF: Pacific bluefin, ALB: albacore.

North of 20 ˚N

	Sets	SKJ	YFT	BET	PBF	ALB	Total
1980	3,053	17,428	10,469	173	10,222	301	38,593
1981	2,620	7,586	5,809	142	22,761	49	36,347
1982	2,697	5,141	2,314	148	15,334	282	23,219
1983	2,585	7,203	4,639	232	13,196	220	25,490
1984	3,747	18,900	7,786	234	3,145	2,986	33,051
1985	3,578	15,616	13,189	629	3,774	1,395	34,603
1986	4,260	22,414	4,743	616	5,865	1,122	34,760
1987	4,016	27,010	4,241	470	8,101	1,216	41,038
1988	3,009	42,465	4,609	248	2,800	1,157	51,279
1989	2,671	17,558	7,442	577	5,413	1,889	32,879
1990	2,055	12,928	6,559	540	2,382	1,799	24,208
1991	2,056	25,439	3,886	766	3,632	3,239	36,962
1992	1,997	14,305	6,032	567	2,679	4,475	28,058
1993	2,141	40,771	3,514	975	2,883	1,657	49,800
1994	1,703	30,612	2,222	956	5,429	2,138	41,357
1995	2,185	28,966	5,644	1,147	7,953	1,100	44,810
1996	1,573	16,691	4,071	743	5,742	256	27,503
1997	2,772	70,985	4,062	919	9,267	1,098	86,331
1998	2,853	95,737	2,810	412	1,925	982	101,866
1999	2,640	31,515	6,643	770	12,228	6,549	57,705
2000	2,928	34,076	4,781	1,067	14,183	2,161	56,268
2001	2,492	45,758	2,549	801	5,892	979	55,979
2002	2,446	39,960	2,289	963	7,422	3,072	53,706
2003	3,024	57,959	3,556	1,341	5,321	837	69,014
2004	2,611	38,068	2,668	1,110	7,146	7,006	55,998
2005	3,360	64,902	3,110	538	10,807	905	80,262

South of 20 ˚N

	Sets	SKJ	YFT	BET	PBF	ALB	Total
1980	1,858	31,391	9,607	391	0	0	41,389
1981	3,046	37,188	21,730	783	0	0	59,701
1982	4,683	70,000	28,777	982	0	0	99,759
1983	5,655	109,834	26,192	1,236	0	0	137,262
1984	7,290	110,075	30,876	469	0	0	141,420
1985	6,976	103,588	34,752	751	0	0	139,091
1986	5,792	108,486	39,724	915	0	0	149,125
1987	5,700	88,445	40,392	1,132	0	0	129,969
1988	6,676	141,207	25,516	358	0	0	167,081
1989	6,903	104,483	33,431	952	0	0	138,866
1990	6,202	127,206	31,198	1,583	0	0	159,987
1991	6,025	124,717	44,712	1,185	0	0	170,614
1992	5,405	125,869	47,067	1,996	0	0	174,932
1993	6,328	96,119	54,344	928	0	0	151,391
1994	4,865	129,539	37,644	720	0	0	167,903
1995	5,471	114,213	39,539	482	0	0	154,234
1996	6,040	139,486	20,468	751	0	0	160,705
1997	4,895	85,919	53,413	7,548	0	0	146,880
1998	4,644	134,510	34,902	2,294	0	0	171,706
1999	4,087	119,377	37,289	2,769	0	0	159,435
2000	4,357	133,650	31,344	3,669	0	0	168,663
2001	3,851	123,570	31,186	5,324	3	0	160,083
2002	4,000	148,097	16,849	3,624	0	0	168,570
2003	4,459	129,484	23,639	3,758	0	0	156,881
2004	4,275	134,551	19,960	3,467	0	0	157,978
2005	4,410	153,631	23,153	4,158	0	0	180,942

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Table 5. Fishing effort (Number of poles·days) and catch in weight (t) by species and of Japanese offshore and distant water pole-and-line fisheries in the Pacific. SKJ: skipjack, ALB: albacore, YFT: yellowfin, PBF: Pacific bluefin, BET: bigeye.

North of 20 ˚N

	Poles*days	SKJ	ALB	YFT	PBF	BET	Total
1980	778,265	127,986	43,007	4,655	671	1,511	177,830
1981	673,584	73,633	25,589	7,026	220	1,795	108,263
1982	661,335	94,187	28,817	6,970	134	2,698	132,806
1983	586,493	104,000	19,591	7,870	44	3,103	134,608
1984	585,828	162,918	25,893	7,444	218	2,863	199,336
1985	491,964	73,698	21,036	8,647	232	3,344	106,957
1986	480,392	130,433	13,813	7,416	158	2,266	154,086
1987	444,438	87,160	19,045	7,506	608	2,571	116,890
1988	362,216	97,290	7,126	7,436	224	3,449	115,525
1989	357,772	87,301	10,905	8,070	207	3,485	109,968
1990	366,511	77,451	13,815	5,733	56	3,172	100,227
1991	275,218	101,684	6,469	4,424	198	1,189	113,964
1992	297,999	88,737	14,856	5,340	140	976	110,049
1993	277,969	127,181	12,459	3,933	34	1,695	145,302
1994	263,710	74,037	30,275	3,753	107	1,837	110,009
1995	267,522	94,713	22,826	4,124	395	2,462	124,520
1996	232,295	57,234	22,305	4,731	52	2,489	86,811
1997	298,889	92,160	34,836	3,520	177	2,516	133,209
1998	283,587	85,920	27,650	2,899	606	1,313	118,388
1999	324,148	91,040	54,855	3,411	58	1,048	150,412
2000	346,220	111,844	21,468	3,396	88	1,763	138,559
2001	322,902	66,623	29,195	2,541	725	1,305	100,389
2002	302,979	56,545	49,432	2,446	92	1,682	110,197
2003	318,874	88,409	34,573	1,965	9	761	125,717
2004	302,940	69,916	34,766	2,175	331	3,257	110,445
2005	302,178	99,511	16,160	3,020	551	1,250	120,492

South of 20 ˚N

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Year	Poles*days	SKJ	ALB	YFT	PBF	BET	Total
1980	410,561	109,548	14	1,573	5	518	111,658
1981	538,707	127,191	10	2,030	10	543	129,784
1982	422,978	105,978	5	2,529	1	1,111	109,624
1983	327,823	120,530	5	1,469	0	669	122,673
1984	289,535	121,577	28	1,258	1	349	123,213
1985	296,158	85,477	3	4,278	0	637	90,395
1986	245,295	103,291	7	994	1	253	104,546
1987	248,177	90,357	9	948	1	245	91,560
1988	219,971	103,714	4	693	0	211	104,622
1989	203,367	96,837	13	1,076	4	86	98,016
1990	150,674	44,940	4	1,237	0	159	46,340
1991	67,981	49,654	0	980	2	43	50,679
1992	60,786	29,912	0	1,564	0	52	31,528
1993	98,889	35,222	12	596	0	74	35,904
1994	83,902	34,907	3	282	0	71	35,263
1995	88,813	37,907	2	403	0	165	38,477
1996	109,033	40,682	60	151	1	60	40,954
1997	75,122	30,340	14	207	0	68	30,629
1998	96,286	38,271	39	163	0	39	38,512
1999	85,488	31,250	101	235	0	49	31,635
2000	81,920	27,016	34	79	0	29	27,158
2001	82,417	29,521	30	75	0	16	29,642
2002	87,958	33,920	11	54	0	33	34,018
2003	74,225	27,356	7	124	0	61	27,548
2004	83,959	28,222	120	110	0	84	28,536
2005	66,028	23,409	17	73	0	21	23,520

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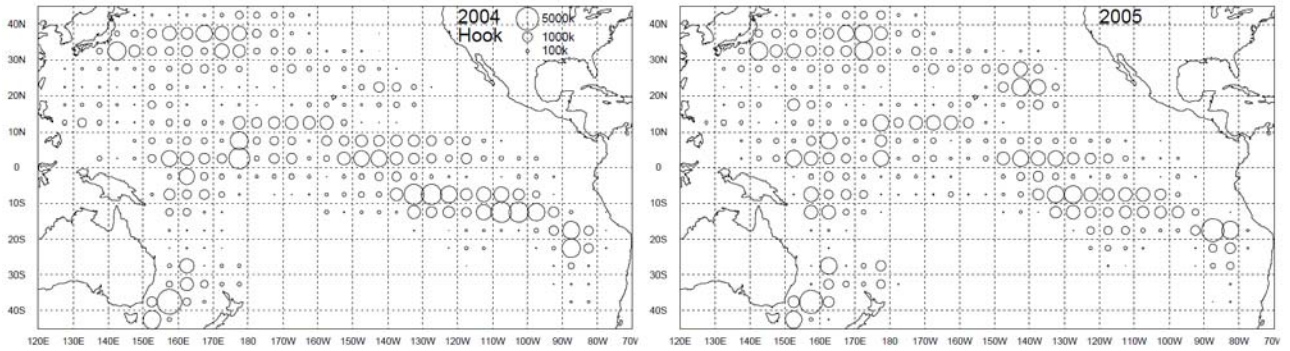

Figure 1. Distribution of fishing effort (Number of hooks) for the Japanese longline fishery (larger than 20 GRT vessels) in the Pacific. Left: 2004, right: 2005.

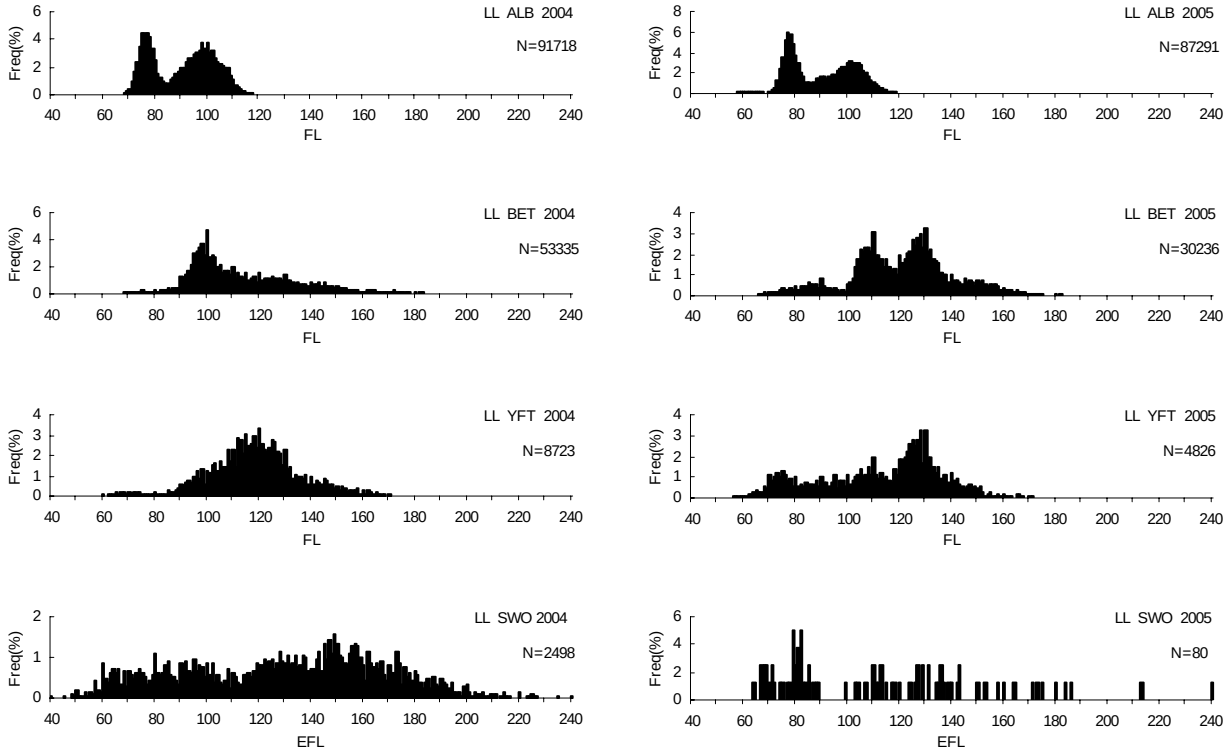

Figure 2. Annual length frequency distribution (simply summing up all measurements) for longline caught albacore, bigeye, yellowfin, and swordfish in 2004 (left) and 2005 (right). Text in the right in each graph indicates gear, species, year, and the number of fish measured.

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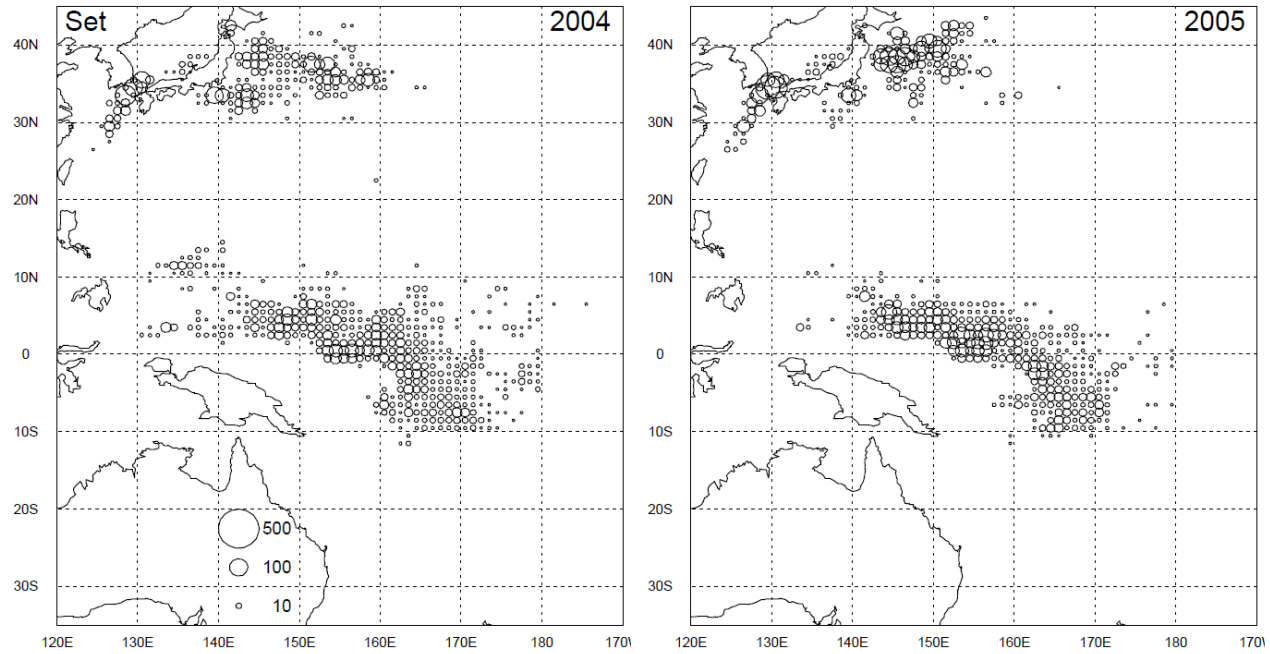

Figure 3. Distribution of fishing effort （number of sets）for the Japanese purse seine fishery in the Pacific. Left: 2004, right: 2005.

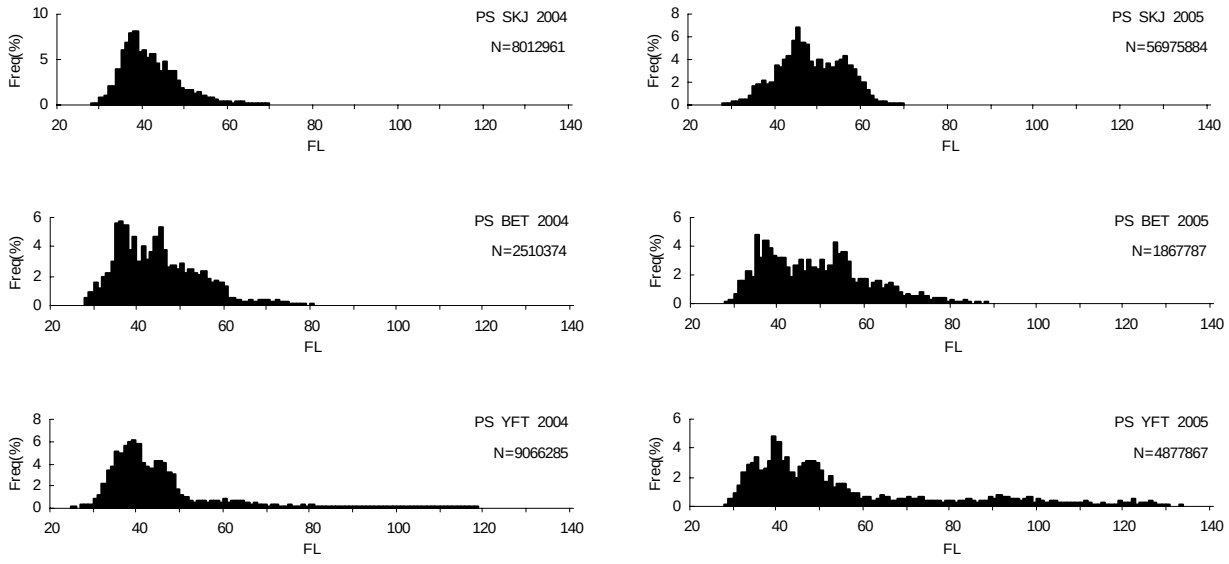

Figure 4. Annual length frequency distribution (so called catch-at-length) for distant water purse seine caught skipjack, bigeye, and yellowfin in 2004 (left) and 2005 (right). Text in the right in each graph indicates gear, species, year, and estimated number of fish caught by this fishery.

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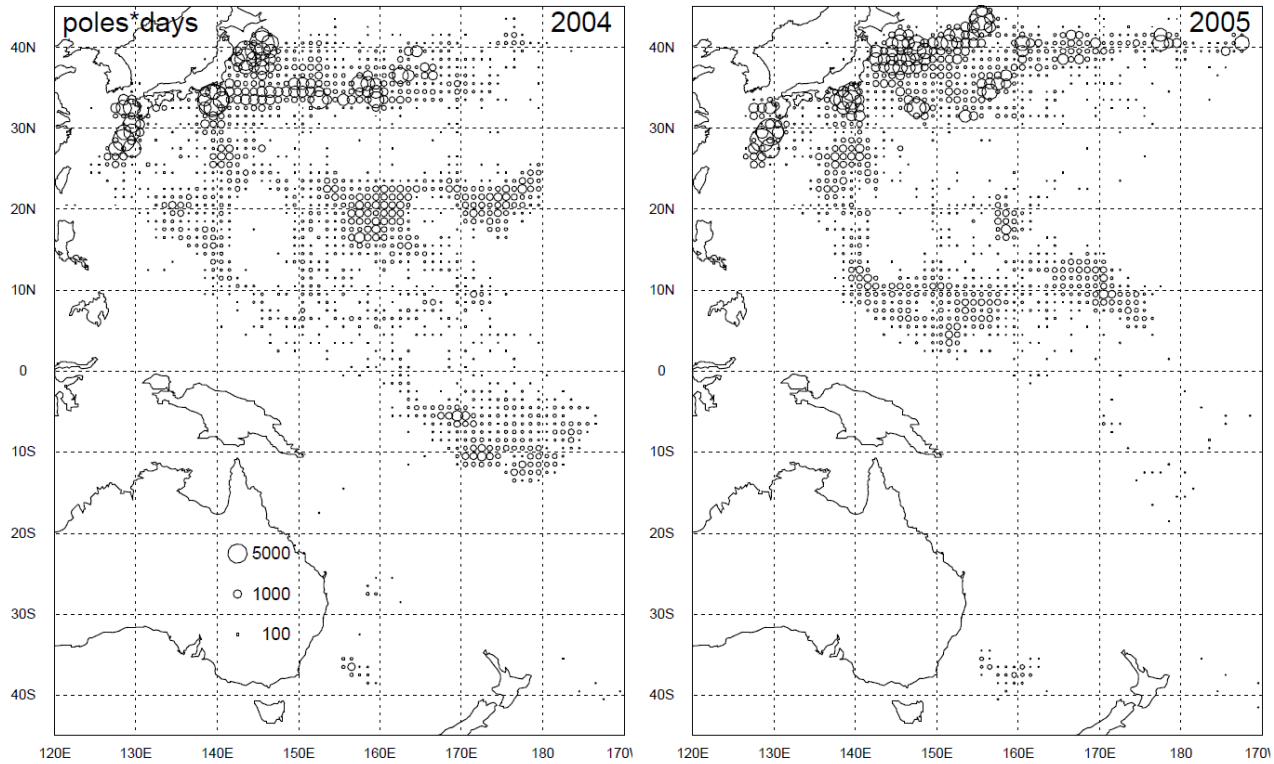

Figure 5. Distribution of fishing effort (number of poles·days) of the Japanese pole-and-line fishery (larger than 20 GRT vessels) in the Pacific. Left: 2004, right: 2005.

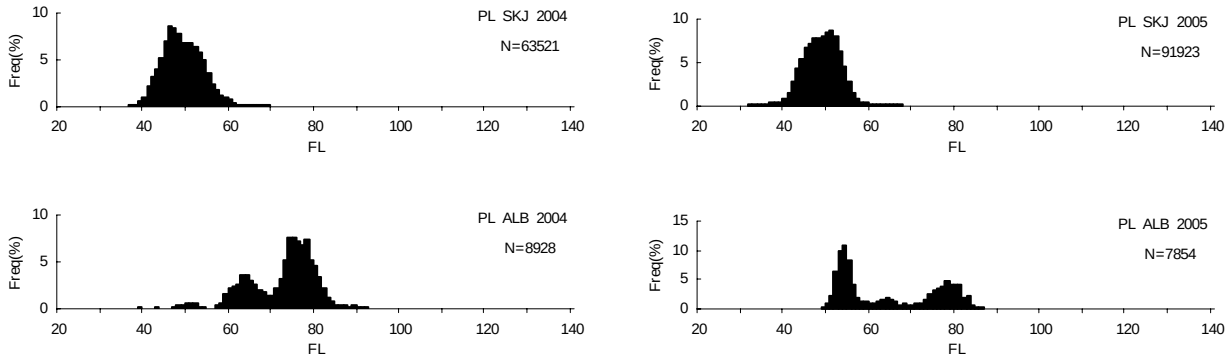

Figure 6. Annual length frequency distribution (simply summing up all measurements) for offshore and distant water pole-and-line caught skipjack and albacore in 2004 (left) and 2005 (right). Text in the right in each graph indicates gear, species, year, and the number of fish measured.

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