8th Meeting of the ISC
July 22-27, 2008
Takamatsu, Japan

National Report of Japan[1]

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July 2008

[1] Prepared for the Eighth Meeting of the International Scientific Committee on Tuna and Tuna-like Species in the North Pacific Ocean (ISC), 22-27 July 2008, Takamatsu, Japan. Document not to be cited without permission of the authors.

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The total landing of tunas (excluding skipjack) caught by Japanese fisheries in the Pacific Ocean in 2006 was 154,000 metric ton (t) and the total landing of swordfish and billfishes (striped marlin, blue marlin and black marlin) was 16,000 t. The landing of skipjack tuna was 310,000 t. Japanese tunas, billfishes and skipjacks catch in 2006 is decreased from 2005. 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 ISC7 (Yamada and Uosaki 2007). Also there was a brief description on Japanese research activities on tuna and tuna-like species in the Pacific Ocean in 2007 and early 2008.

1. Trends in fleet size

Table 1 shows the number of Japanese tuna vessels actually engaged in fishing by type of fishery and by vessel size class during 1980-2006 (Anonymous 1982-2007). The total number of longline vessels shows continuous declining trend since the early 1990s and the number of vessel in 2006 is 1,208 which is about 60% of the average of the one in the 1980s. The number of longline vessels of the largest size class (larger than 200 Gross Register Tonnage (GRT)) was near constant in the period between the late 1960s and the mid 1990s. In accordance with the agreement of the FAO's international action plan on fishing capacity, Japan decreased its large longline boats by 20% in 1998. The number of longline boats continued to decline thereafter. While the number of vessels for 20-49 GRT and 50-100 GRT showed a sharp decline since the late 1980s, the number of vessels of smallest size class (less than 20 GRT) fluctuated at around 700. As information for the late 2005 and after, the declining trend has been accelerated by the further slowdown of economics 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 ceased their business and many vessels are now moored at the various home ports. This year, a part of the Japanese distant-water longliners decided to suspend fishing for some time because of high fuel cost.

The number of purse seine vessels shown in Table 1 includes only the vessel mainly targeting tunas. The total number of purse seine vessel was 52 in 2006, and it was nearly 80% of that 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 change much in number.

In case of the pole-and-line boats, the number of vessels larger than 20 GRT declined to 121 in 2006 from 140 in 2005, which corresponds to almost one third of the average in the 1980s. The trend in the number of vessels smaller than 20 GRT also shows the general decreasing trend since the 1980s, and the number of vessels in 2006 was only 8% of the average of the 1980s.

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 1982-2007).

2.1. Longline

Longline fisheries had been classified by the type of license issued by the Government, i.e., coastal (correspond to vessel smaller than 20 GRT), offshore (20-120 GRT), and distant water (larger than 120 GRT) until 2001. Since 2002, the categorization of the license was changed, and longline vessels of 10–20 GRT operating outside the Japanese EEZ were re-categorized as offshore license. Latest available fleet statistics are provisional 2006 data for both vessels larger and less than 20 GRT.

Total fishing effort (days at sea) for longline vessels less than 20 GRT has gradually increased since 1990 (Table 2). The same statistics for 2005 was 138,000 days which showed a 80 % increase over the average in the 1980s. Total tuna and billfish catch of these vessels fluctuated between 31,000 to 41,000 t in the most recent 10 years. Albacore occupies 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 13,000 t in 2004, and again increased to 16,000 t in 2006.

Total catch of longline vessels larger than 20 GRT (offshore and distant water fisheries) in the entire Pacific were 69,000 t in 2006, which was the lowest value since 1980 (Table 3). In the North Pacific (north of the equator), 87 million hooks were employed and 39,000 t of tunas and billfishes was caught in 2006. In the South Pacific, the fishing effort was 64 million hooks and the catch was 30,000 t in 2006. Bigeye has been the dominant species for both the North and the South Pacific and the catch in 2006 were 20,000 t in the North Pacific and 12,500 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 in the 1980s, and then it decreased continuously to 100 million hooks in the early 2000s, and it has further decreased in the most recent years. The amount of effort in the 2006 is about 40% of the average in the 1980s. The similar declining trend is also seen in the South Pacific. Catch of bigeye, yellowfin and marlins in both the North and the South Pacific were stable in the 1980s, but it showed a decreasing trend in the 1990s and thereafter. It was in the lowest level since 1980 in the most recent years. 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 declined again, though the bluefin catch showed an increase in 2004 and 2005. The catch of swordfish appears to be relatively stable. The catch of striped marlin in the North Pacific shows steady decreasing trend since the late 1980s, and is the lowest since 1980.

The catch and effort by the Japanese distant water longline fishery is likely to decrease due to the economic circumstances (i.e. high fuel cost, low price of tuna, high labour cost). As most of these vessels have operated in the waters other than the North Pacific (more than 80%), the decline likely to be larger in those waters.

Annual distribution of fishing effort for longline vessels larger than 20 GRT in 2005 and 2006 are shown in Figure 1. In both years, 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 frequency 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 consists of one relatively large seiner (300 GRT) than typical size of the purse seiner and one carrier instead of two carriers. The group purse seiner operates in the offshore waters off Japan. The carrier holds fish

in chilled water with ice and unloads those catches. 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 grounds were well separated by latitude into the northern temperate waters around Japan and the tropical waters. In the northern area, the number of sets made 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 tropical area, the number of sets peaked at 7,000 sets in 1984 then gradually decreased to around 4,000 sets until the early 2000s and leveled off thereafter (Table 4). Total catch in the northern area has fluctuated in the range between 23,000 and 102,000 t since 1980. The skipjack catch dominate among species in this area followed by yellowfin and Pacific bluefin, but catch by species also fluctuated. The skipjack catch in 1998 in this area was highest in the history, resulting in 96,000 t in total catch.

In the tropical waters, fishing effort increased rapidly until 1983 and then it was leveled off. Total catch in the tropical area was stable at around 150,000 t or more after the mid 1980s. Skipjack accounted for the 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 yellowfin catch is also in the range from 30 to 60cm but there are some fishes 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 of Japan 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 harvest 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 to 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 latitude but more continuous than the purse seine fishing grounds (Figure 5). Generally, fishing effort has been decreasing, especially in the tropical area (Table 5). The amounts of effort in 2006 are the lowest since 1980. The total fishing effort in 2006 was 250,000 poles-days, down to 46 % of the average of the 1980s for the temperate area and was 59,000 poles-days, down to 19 % of the average of the 1980s for the tropical area. Despite the substantial reduction of the fishing effort, the catch of skipjack and albacore in the temperate area appears to be moderately decreased. In the temperate area, recent catches were variable, between 60,000 and 110,000 t for skipjack, and between 20,000 and 50,000 t for albacore. Skipjack and yellowfin catches in the tropical area, by the large pole-and-line vessels, showed a steep decline reflecting the concomitant reduction of the fishing effort during the 1980s.

Recent annual catch by the coastal pole-and-line fishery are around 10,000 t or less and relatively minor compared with that of the offshore and distant water pole-and-line fisheries.

The size of skipjack caught by this fishery is ranged from 40 to 60 cm FL and ranged from 50 to 90 cm for

albacore. Several clear modes are obvious (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 2007).

The large mesh driftnet fishery, that historically expanded its 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 this fishery.

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

Total catch of Pacific bluefin by Japan has been fluctuating in the range between 11,000 and 14,000 t since 2000, except for 2005 when the catch increased to 20,000 t due to the increased catch by small purse seine and troll fisheries (Oshima et. al., 2008). Purse seine catch is the largest portion among gears, and their catch was 5,700 t in 2007 which is the 3rd lowest amount since 1990. The longline catch had increased to 1,151 t in 2006, which is about 10% lower than the average catch in 2000 - 2006. The annual troll catch has been fluctuated between 1,500 – 5,100 t since 1994, and the catch in 2007 was 25% lower than the average of this period (1994 – 2007). The troll fishery supplies fish not only for local market but also for the fattening.

The catches of North Pacific albacore are mainly made by the longline and the pole-and-line fisheries. The pole-and-line catch was 38,300 t (provisional) in 2007, which is almost same to the catch in 2004 and more than twice of the catch in 2006. This is due to that very good fishing ground was developed from May to June at relatively near shore area (32-38˚N, 142-148˚E) by the middle-sized pole-and-line vessels. The albacore catch by longline in the North Pacific was 21,600 t in 2006 (Tables 2 and 3) corresponding to 105% of 2005.

Japanese swordfish catch in the North Pacific has been fluctuated between 6,300 and 11,500 tons since 1980, and the catch in 2006 (9,200 t) was nearly the average value in the period between 1980 and 2006. In the most recent years, total Japanese swordfish catch showed gradual increasing trend primary due to the increase of catch by longliners, which recorded relatively higher catch ratio in the recent years. The length composition of catch in 2006 is mono-modal one with its peak around 130 cm (eye fork length), and the shape of the composition in 2006 is roughly the same as the one in 2005 (Fig. 2).

3. Compilation of basic fisheries data

The logbook systems have been in place for offshore and distant water longline, pole-and-line, and purse seine fisheries. From 1994, the logbook system was introduced on the coastal longline vessels (10-20 GRT) fishing both within and outside the Japanese EEZ and these vessels were included in the offshore category since 2002. Historical Category II data was compiled from those logbook data and submitted to the ISC Statistics Working Group in July 2007.

There are small scale fisheries in the coastal waters of Japan such as troll and set net which are not covered by the current logbook system. Catches by these fisheries 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 collection of catch, effort and size data 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 2007 conducted by the Fisheries Agency of Japan and the NRIFSF relating to tunas and billfish in the Pacific, in addition to the several short cruises for tagging.

Two research cruises for sampling 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 of bluefin tuna caught by the mid-water trawl gear in the vicinity of Nansei-Islands in June. The other one was for bluefin larvae caught by plankton nets in the vicinity of Nansei-Islands during May to July. The purpose of this cruise was to study survival process and distribution during early life history of bluefin tuna. In both research cruises, some bluefin tuna larvae and early juveniles were successfully caught, and analysis of data and samples is being conducted by the stuff of NRIFSF.

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 by R/V Kurosaki, RV Taikei No.2, R/V Kaisei-maru, and a training vessel Shonan-maru in 2007. Mitigation effectiveness and practical feasibility of tori-lines, circle hooks and side-setting were examined in these experiments.

4.2. Tagging

The tagging using conventional tag has been conducted by research and training vessels as well as commercial vessels. Some of these activities are opportunistic 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 2007, 951 bluefin tuna, 233 bigeye, 1,111 yellowfin and 1,085 skipjack were tagged and released. There were reported recoveries of 41 bluefin tunas, 40 bigeye, 7 yellowfin, and 49 skipjack. In addition to conventional tagging, 14 Pacific bluefin tuna, 14 albacore and 21 bigeye were tagged with an electric tags (archival and pop-up tags) and released. Of those, 3 archival tags attached on bluefin tuna and 1 archival tags on 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. The sex combined growth curve were estimated using otoliths collected, and this growth curve were used for the stock assessment of bluefin tuna conducted in May, 2008.

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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	247	1	36	58	45	387
2006	709	1	43	54	401	1,208	16	36	52	213	1	27	58	36	335

[*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

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, OTM: the other marlins. Data in 2006 is provisional.

Year	Days	PBF	ALB	BET	YFT	SWO	MLS	BUM	OTM	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	794	16,918	6,565	3,936	956	796	915	43	30,924
2003	114,344	1,152	16,309	8,402	6,385	1,058	842	1,228	35	35,411
2004	110,543	1,616	12,960	8,523	5,768	1,505	1,000	1,444	35	32,849
2005	138,327	1,818	14,648	9,069	5,645	1,271	655	1,117	22	34,245
2006	-	1,058	15,936	11,730	4,898	1,465	520	1,076	36	36,719

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 2006 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)

	Effort	PBF	SBF	ALB	BET	YFT	SWO	MLS	BUM	BLM	SFA	Total
1980	215,102	140	0	11706	44,651	44,827	6005	5872	5,613	388	532	119,733
1981	218,508	313	0	14970	36,556	33,122	7039	3957	5,518	272	539	102,285
1982	200,830	206	0	13040	44,655	28,539	6065	5211	6,051	206	891	104,864
1983	196,470	87	0	11286	45,310	30,014	7692	3575	4,796	199	591	103,550
1984	201,106	57	0	11702	41,347	26,402	7177	3335	6,248	226	337	96,831
1985	198,726	38	0	10204	49,584	21,508	9335	3698	5,164	226	161	99,918
1986	189,379	30	0	8187	48,445	24,340	8721	5178	5,922	124	211	101,158
1987	204,702	30	0	9165	54,245	25,328	9495	5439	5,370	147	221	109,440
1988	206,674	51	0	9103	39,193	19,880	8574	5768	5,054	146	293	88,062
1989	215,363	37	0	8320	54,545	20,337	6690	4582	5,117	86	377	100,091
1990	198,126	42	0	9272	55,286	22,963	5833	2298	4,116	75	117	100,001
1991	182,518	48	0	10375	43,229	18,833	4809	2677	4,094	85	161	84,312
1992	172,732	85	0	11006	49,136	21,688	7234	2757	3,720	111	128	95,865
1993	172,433	145	0	13342	41,114	18,667	8298	3286	4,600	69	118	89,638
1994	157,907	238	0	13199	37,738	16,510	7327	2706	4,715	99	214	82,746
1995	140,766	107	0	11553	31,362	18,900	6392	3254	4,423	60	243	76,293
1996	125,077	123	0	13813	24,921	17,211	6878	1731	2,357	54	103	67,191
1997	121,879	142	0	13973	31,568	19,174	6955	2028	2,975	56	98	76,968
1998	119,921	169	0	12352	34,806	12,812	6203	1685	2,448	60	119	70,654
1999	130,340	127	0	12120	31,230	11,462	5519	1448	2,751	50	182	64,889
2000	121,093	121	0	10767	26,450	14,492	6135	1063	2,552	61	153	61,792
2001	123,799	63	0	11262	31,474	11,974	6904	865	2,554	37	75	65,209
2002	112,469	47	0	6667	30,584	8,713	6187	690	2,242	59	60	55,249
2003	105,583	85	0	4598	23,717	7,640	5340	901	1,969	27	116	44,393
2004	96,336	231	0	4381	24,273	6,443	5350	620	1,927	26	71	43,321
2005	86,950	117	0	5900	20,414	6,228	5356	510	1,652	28	85	40,291
2006	87,085	77	0	5670	19,942	5,974	6287	542	1,650	26	136	40,302

South Pacific

Year	Effort	PBF	SBF	ALB	BET	YFT	SWO	MLS	BUM	BLM	SFA	Total
1980	173,836	40	9,344	2557	47,044	29,019	2883	3180	4,404	616	544	99,632
1981	181,624	29	7,481	4898	38,595	30,156	3145	4221	4,290	641	566	94,021
1982	157,652	20	3,719	4822	38,722	28,030	2819	4265	4,418	666	509	87,990
1983	142,343	8	3,189	4991	39,738	27,542	2568	2872	4,629	527	343	86,407
1984	134,417	22	2,315	3598	35,958	20,882	2312	2007	5,510	528	340	73,471
1985	128,463	9	2,241	3676	48,796	28,501	2242	1783	3,810	447	209	91,714
1986	166,820	14	2,119	4466	68,939	23,304	2971	2371	4,922	398	257	109,761
1987	181,925	33	2,578	4103	61,012	15,674	3287	3544	5,799	397	288	96,715
1988	192,599	30	1,988	6914	48,875	26,181	4785	2918	4,541	588	346	97,167
1989	154,450	32	4,091	4890	40,469	20,926	2931	3346	3,060	238	279	80,262
1990	171,203	27	4,591	5321	60,057	29,707	3493	3079	2,942	169	306	109,692
1991	188,112	20	2,525	4633	57,313	20,909	3559	2471	3,588	143	238	95,399
1992	173,568	16	2,779	5162	52,787	17,400	5863	2411	4,686	200	319	91,623
1993	151,422	10	2,394	8168	39,498	21,465	3827	2602	4,362	251	203	82,780
1994	164,015	20	1,668	8680	43,653	34,267	3993	2817	6,419	333	369	102,217
1995	131,169	10	1,080	7301	33,479	25,100	3146	2341	4,894	228	278	77,857
1996	106,626	9	1,128	4493	26,080	16,556	3140	2517	2,302	136	218	56,580
1997	96,029	12	936	4767	27,150	14,707	3765	2670	3,171	117	243	57,538
1998	108,544	10	1,012	7781	26,759	12,267	3681	2692	2,974	171	271	57,619
1999	72,100	17	1,747	3829	13,236	6,902	2135	1153	1,337	57	212	30,626
2000	81,392	7	1,155	2992	21,961	19,731	2016	704	1,473	71	266	50,375
2001	97,087	6	1,689	4883	26,905	14,067	3092	1212	1,508	57	330	53,749
2002	107,555	5	1,918	5414	25,766	10,912	2986	1048	1,547	70	340	50,005
2003	104,008	12	1,852	4373	18,315	11,415	2725	1020	1,739	65	304	41,821
2004	81,494	9	1,191	5586	16,770	9,610	2228	681	1,468	59	230	37,831
2005	68,926	14	909	6516	12,714	6,796	1689	649	1,268	68	309	33,302
2006	64,738	11	583	5694	12,532	7,191	1613	723	1,023	78	339	29,786

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	11,327	301	39,698
1981	2,620	7,586	5,809	142	25,422	49	39,008
1982	2,697	5,141	2,314	148	19,234	282	27,119
1983	2,585	7,203	4,639	232	14,774	220	27,068
1984	3,747	18,900	7,786	234	4,433	2,986	34,339
1985	3,578	15,616	13,189	629	4,154	1,395	34,983
1986	4,260	22,414	4,743	616	7,412	1,122	36,307
1987	4,016	27,010	4,241	470	8,653	1,216	41,590
1988	3,009	42,465	4,609	248	3,605	1,157	52,084
1989	2,671	17,558	7,442	577	6,190	1,889	33,656
1990	2,055	12,928	6,559	540	2,989	1,799	24,815
1991	2,056	25,439	3,886	766	9,808	3,239	43,138
1992	1,997	14,305	6,032	567	7,162	4,475	32,541
1993	2,141	40,771	3,514	975	6,600	1,657	53,517
1994	1,703	30,612	2,222	956	8,131	2,138	44,059
1995	2,185	28,966	5,644	1,147	18,909	1,100	55,766
1996	1,573	16,691	4,071	743	7,644	256	29,405
1997	2,772	70,985	4,062	919	13,152	1,098	90,216
1998	2,853	95,737	2,810	412	5,390	982	105,331
1999	2,640	31,515	6,643	770	16,173	6,549	61,650
2000	2,928	34,076	4,781	1,067	16,486	2,161	58,570
2001	2,492	45,758	2,549	801	7,620	979	57,706
2002	2,446	39,960	2,289	963	9,273	3,072	55,556
2003	3,024	57,959	3,556	1,341	6,344	837	70,036
2004	2,611	38,068	2,668	1,110	7,369	7,006	56,221
2005	3,418	64,867	3,118	538	11,260	905	80,688
2006	2,483	57,971	3,196	1,136	7,161	321	69,784

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	168,662
2001	3,851	123,570	31,186	5,324	0	0	160,080
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
2006	4,553	158,438	24,988	3,472	0	0	186,897

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	1,392	1,511	178,551
1981	673,584	73,633	25,589	7,026	754	1,795	108,797
1982	661,335	94,187	28,817	6,970	1,777	2,698	134,449
1983	586,493	104,000	19,591	7,870	356	3,103	134,920
1984	585,828	162,918	25,893	7,444	587	2,863	199,705
1985	491,964	73,698	21,036	8,647	1,817	3,344	108,542
1986	480,392	130,433	13,813	7,416	1,086	2,266	155,014
1987	444,438	87,160	19,045	7,506	1,565	2,571	117,847
1988	362,216	97,290	7,126	7,436	907	3,449	116,208
1989	357,772	87,301	10,905	8,070	754	3,485	110,515
1990	366,511	77,451	13,815	5,733	536	3,172	100,707
1991	275,218	101,684	6,469	4,424	286	1,189	114,052
1992	297,999	88,737	14,856	5,340	166	976	110,075
1993	277,969	127,181	12,459	3,933	129	1,695	145,397
1994	263,710	74,037	30,275	3,753	162	1,837	110,064
1995	267,522	94,713	22,826	4,124	270	2,462	124,395
1996	232,295	57,234	22,305	4,731	94	2,489	86,853
1997	298,889	92,160	34,836	3,520	34	2,516	133,066
1998	283,587	85,920	27,650	2,899	85	1,313	117,867
1999	324,148	91,040	54,855	3,411	35	1,048	150,389
2000	346,220	111,844	21,468	3,396	102	1763	138,573
2001	322,902	66,623	29,195	2,541	180	1305	99,844
2002	302,979	56,546	49,432	2,446	99	1682	110,205
2003	318,874	88,409	34,573	1,965	44	761	125,752
2004	302,940	69,916	34,766	2,175	132	3257	110,246
2005	302,178	99,511	16,160	3,020	606	1250	120,547
2006	251,468	69,964	16,332	2,590	108	3667	92,661

South of 20 ˚N

	Poles*days	SKJ	ALB	YFT	PBF	BET	Total
1980	410,561	109,548	14	1,573	0	518	111,653
1981	538,707	127,191	10	2,030	0	543	129,774
1982	422,978	105,978	5	2,529	0	1,111	109,623
1983	327,823	120,530	5	1,469	0	669	122,673
1984	289,535	121,577	28	1,258	0	349	123,212
1985	296,158	85,477	3	4,278	0	637	90,395
1986	245,295	103,291	7	994	0	253	104,545
1987	248,177	90,357	9	948	0	245	91,559
1988	219,971	103,714	4	693	0	211	104,622
1989	203,367	96,837	13	1,076	0	86	98,012
1990	150,674	44,940	4	1,237	0	159	46,340
1991	67,981	49,654	0	980	0	43	50,677
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	0	60	40,953
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	81920	27,016	34	79	0	29	27,158
2001	82417	29,521	30	75	0	16	29,642
2002	87958	33,920	11	55	0	32	34,018
2003	74225	27,356	7	124	0	61	27,548
2004	83959	28,222	120	110	0	84	28,536
2005	66028	23,409	17	73	0	21	23,520
2006	59257	23,780	7	100	0	78	23,965

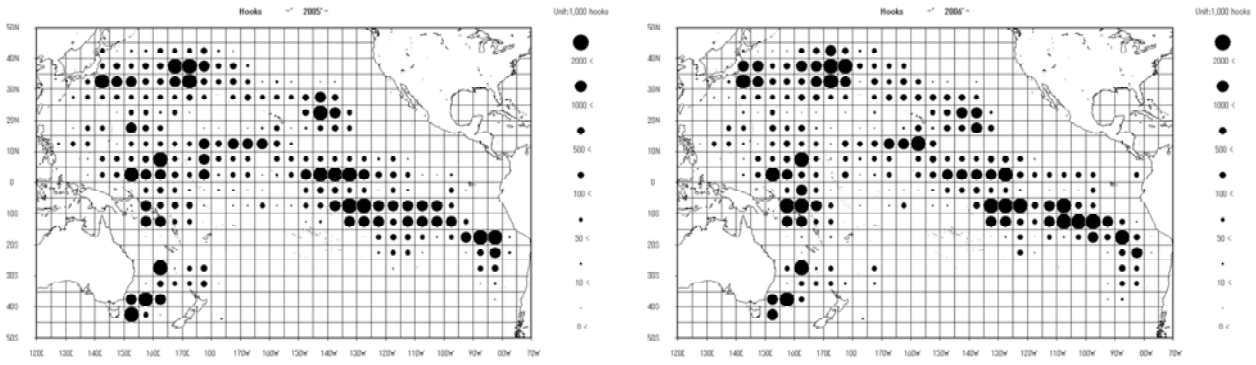

Figure 1. Distribution of fishing effort (Number of hooks) for the Japanese longline fishery (larger than 20 GRT vessels) in the Pacific. Left: 2005, right: 2006.

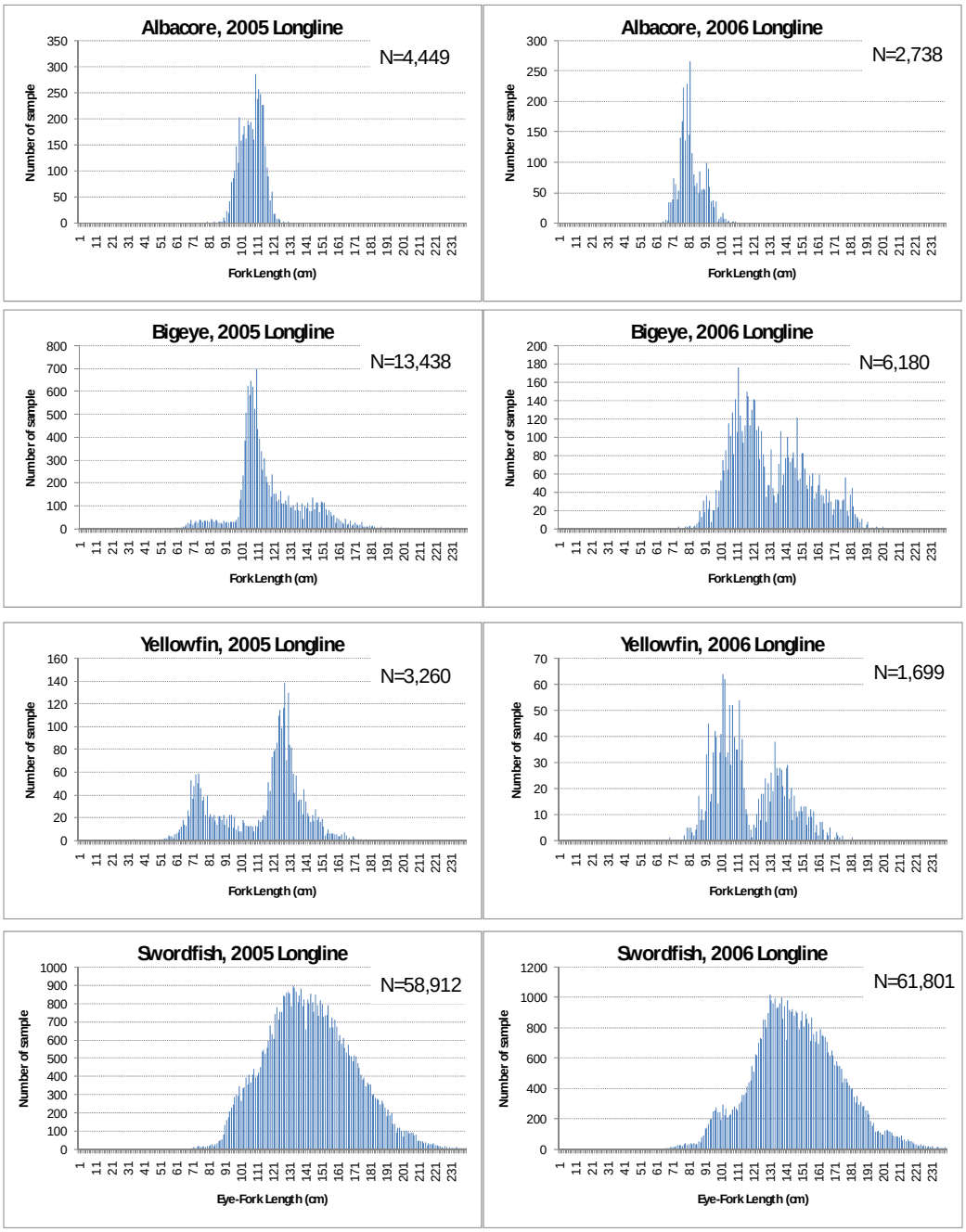

Figure 2. Annual length frequency distribution (simply summing up all measurements) for longline caught albacore, bigeye, yellowfin, and swordfish in 2005 (left) and 2006 (right). Text in the right in each graph indicates gear, species, year, and the number of fish measured.

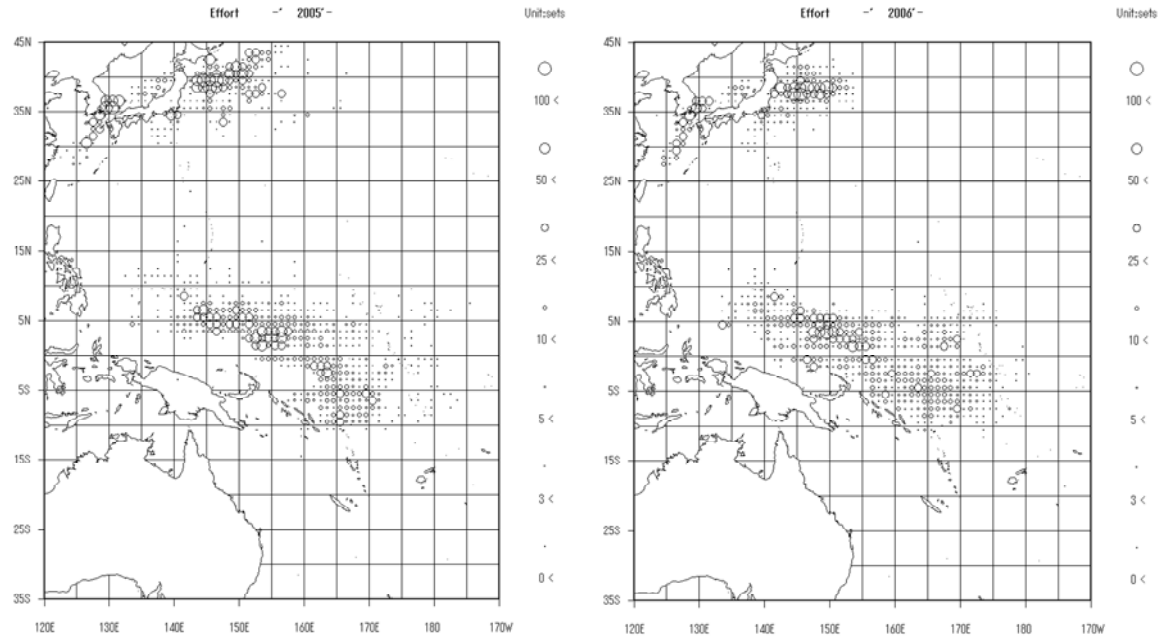

Figure 3. Distribution of fishing effort （number of sets）for the Japanese purse seine fishery in the Pacific. Left: 2005, right: 2006.

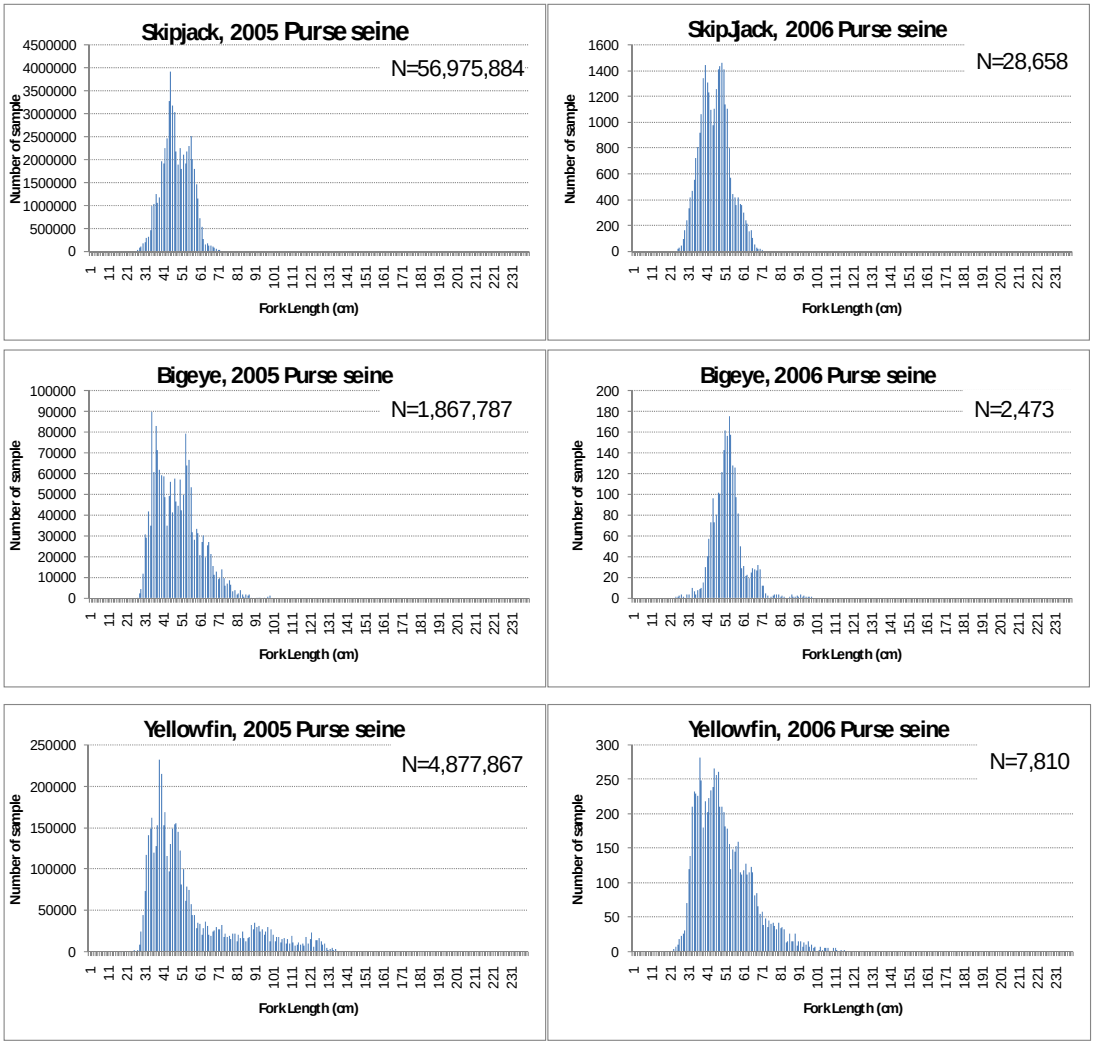

Figure 4. Annual length frequency distribution (so called catch-at-length) for distant water purse seine caught skipjack, bigeye, and yellowfin in 2005 (left) and 2006 (right). Text in the right in each graph indicates gear, species, year, and estimated number of fish caught by this fishery.

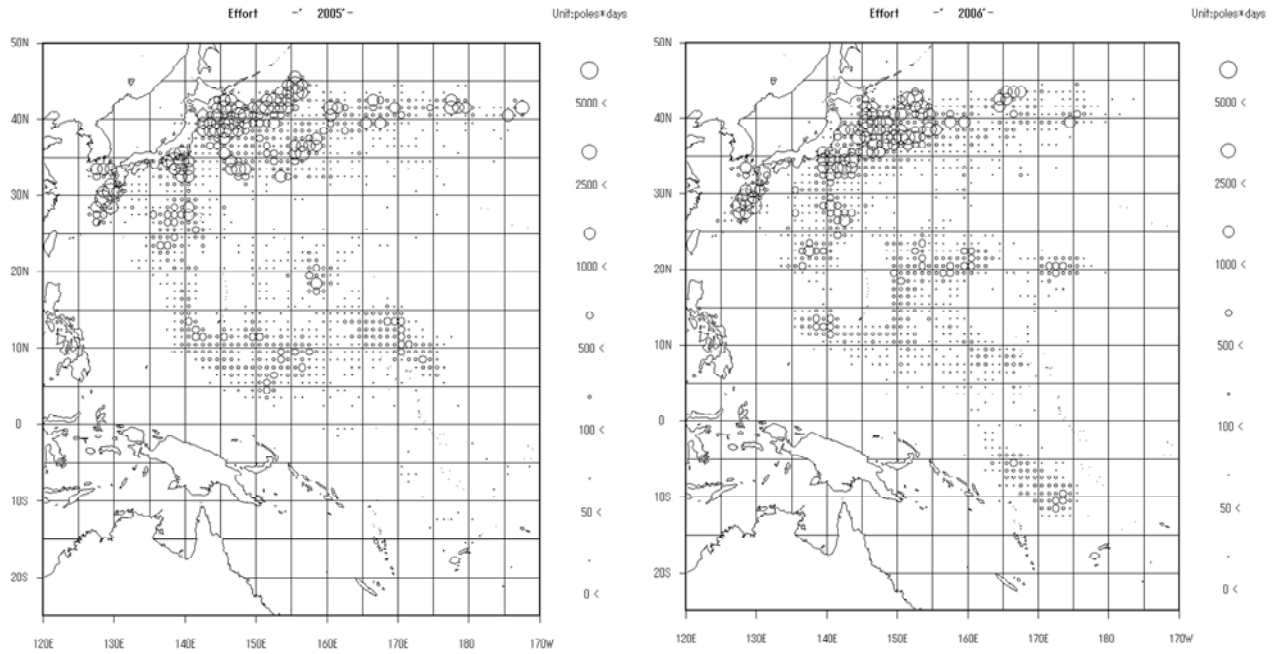

Figure 5. Distribution of fishing effort (number of poles·days) of the Japanese pole-and-line fishery (larger than 20 GRT vessels) in the Pacific. Left: 2005, right: 2006.

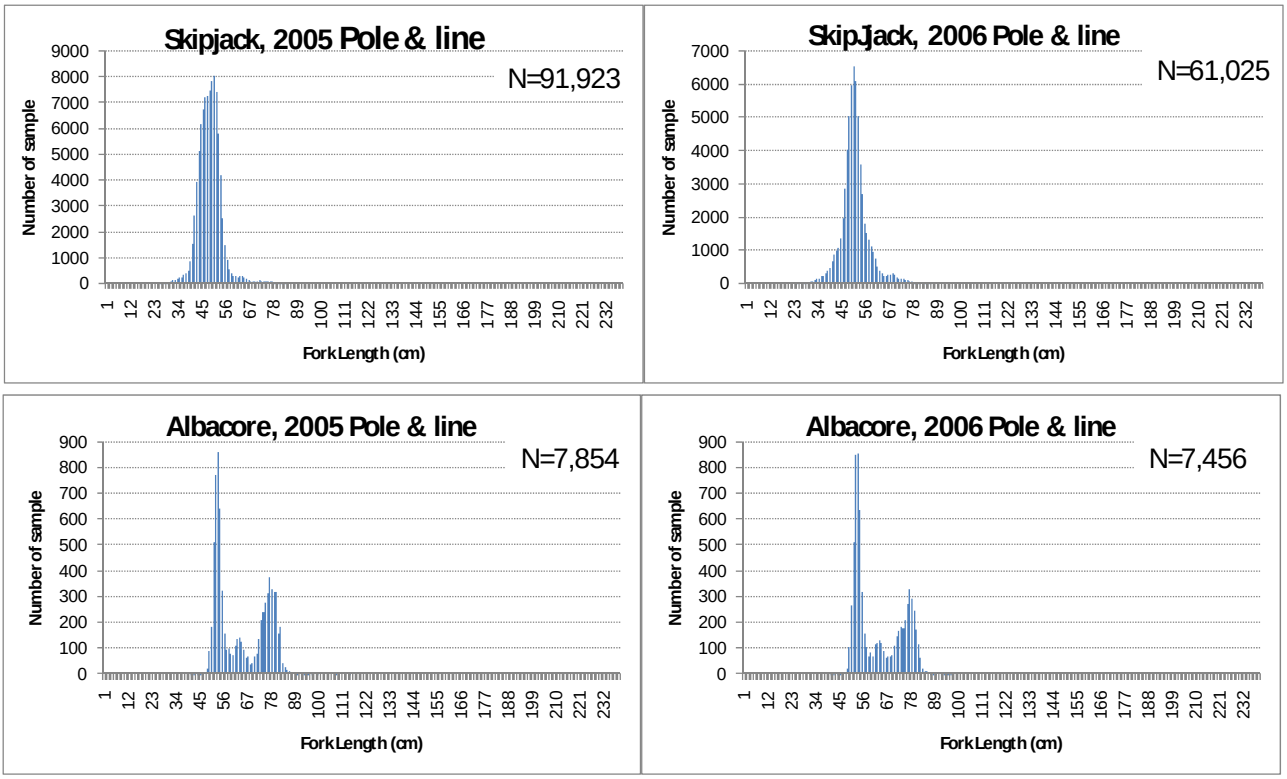

Figure 6. Annual length frequency distribution (simply summing up all measurements) for offshore and distant water pole-and-line caught skipjack and albacore in 2005 (left) and 2006 (right). Text in the right in each graph indicates gear, species, year, and the number of fish measured.