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National Report of Japan[1]

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Summary

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. This paper described the recent trend of the Japanese tuna fisheries in the north Pacific Ocean and updated the statistics given in the previous National Report for ISC14 (Hiraoka et al 2014). The total catch of tunas (excluding skipjack) caught by Japanese fisheries in the north Pacific Ocean was 100,142 metric ton (t) in 2013 and 113,380 t in 2014. The total catch of tunas (including skipjack) caught by Japanese fisheries in the north Pacific Ocean was 294,311 metric ton (t) in 2013 and 277,251 t in 2014. The total catch of swordfish and striped marlin was 6,903 t in 2013 and 7,754 t in 2014. In addition to fisheries description, a brief description was given on Japanese research activities on tuna and tuna-like species in the Pacific Ocean in 2014. The brief reports of Pacific Bluefin Tuna and Albacore Tuna Aging Workshop were also provided.

1. Trends in fleet size

Tables 1A and 1B show the number of Japanese tuna fishing vessels actually engaged in fishing by type of fishery and by vessel size class during 1980-2006 (MAFF 1982-2008) and 2006-2014. The number of active vessels 2006-2014 was estimated based on logbook data. The coastal longline vessels less than 20 Gross Register Tonnage (GRT), the research

and training vessels of both longline and pole-and-line are not included in Table 1B. The values of number of vessels in 2013 and 2014 are provisional in those tables.

The total number of longline vessels show continuous declining trend since the early 1990s (Table 1A). The number of longline vessels of the largest size class (< 200 GRT) was near constant in the period between the beginning of 1980s and the mid-1990s. In accordance with the agreement of the FAO's international action plan on fishing capacity, Japanese government implemented fleet reduction program and decreased its large longline vessels by 20% in 1998. The number of longline vessels continued to decline thereafter. In 2009, Japanese government implemented 2nd fleet reduction program for this fishery following management measures adopted in tuna RFMO. Recent declining trend for larger than 50 GRT are remarkable, the number of vessels of 100-199 GRT was 21 in 2014 which is 40% of that in 2006, and the number of vessels of 50-99 GRT was 17 in 2014 which is 39% of that in 2006 (Table 1B). This large reduction were mainly derived from high price of fuel especially since 2007 and the fleet reduction program implemented by the Government of Japan in March 2009 following a management measures agreed in WCPFC. For the under 50 GRT vessel classes, the number of vessels for 20-49 GRT showed sharp decline since the late 1980s whereas the number of vessels of smallest size class (< 20 GRT) fluctuated at around 700 during the 1980-2006 (Table 1A). The number of vessels of 10-49 GRT was relatively stable, ranging between 240 and 290 during the 2006-2014 (Table 1B).

The total number of purse seine vessel was 52 in 2006, and it was nearly 80% of that in the 1980s (Table 1A). The number of the smaller size (< 200 GRT) purse seine vessels has decreased since the late 1980s. However, the number of purse seine vessels shows a trend of slight increase since 2006. The purse seine vessel which is allowed to operate in the tropical waters is larger vessel (currently, > 348 GRT). The number of such vessel has been 35 and has not changed since 1995.

A trend of the number of small sized pole-and-line vessels (< 20 GRT) showed a decreasing trend during the 1995-2006, and the number of vessels in 2006 was 44% of that in 1995 (Table 1A). The number of large size pole-and-line vessel (50-199 GRT) was 54 in 2014 which is 65% of that in 2006 (Table 1B). The number of pole-and-line vessels of over 200 GRT also shows declining trend with the lesser extent, is 25 in 2014 which is 83% of that in 2006 (Table 1B).

2. Catch and effort trends of the major fisheries

2.1 Longline

Longline is classified by the type of license issued by the Government of Japan, i.e., coastal (< 20 GRT and can fish only in Japanese EEZ), small offshore (10-20 GRT), offshore (10-120 GRT), and distant water (> 120 GRT).

The fishing effort of the distant water and offshore longline 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 until 2009 (Fig. 1). After 2009, the amount of effort was relatively stable between 46-48 million hooks (Fig. 1). Annual distribution of fishing effort of longline in 2013 and 2014 are shown in Fig. 2. In those years, the fishing grounds were located in east-west direction off Japan to Hawaii, equatorial area between 15 ˚S and 15 ˚N, off Australia and off Peru.

Total catch of distant water and offshore longline in the north Pacific has been decreased since the highest catch of 119,752 t in 1980, and it was 21,614 t in 2014 which is 18% of that in 1980 (Fig. 1). Bigeye has been the dominant species in this fishery in the north Pacific. The bigeye catch, which was stable in the 1980s and about 50,000 t in late 1980s, showed a declining trend in the 1990s and decreased to less than 10,000 t in 2009. Yellowfin catch ranged between 30,000 t and 50,000 t until early 1980s. It has gradually decreased into about 10,000 t in 2001 and into less than 5,000 t in 2007. Albacore catch which have fluctuated around 10,000 t until 2001 decreased to about 4,000-6,000 t and kept stable at a low level during the period 2003-2014.

2.2 Purse seine

There are two types of Japanese purse seiners targeting tunas, i.e., single and group purse seine. Historically, the group seiner consists of one purse seiner (100-199 GRT) and one searching vessel and two carrier vessels, and operates in the temperate northwestern Pacific (Fig. 4). New type of group seiner launched at March 2005, which consists of one 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. Meanwhile, the single purse seiner (> 349 GRT) operates mainly in the tropical waters of the central and western Pacific, but seasonally operates in the temperate waters (Fig. 4).

The fishing effort of the purse seine in the North Pacific was around 9,000 sets in the late 1980s, and then decreased to about 6,000 sets in 1998 (Fig. 3). The fishing effort generally stayed at the level about 4,000-6,000 sets in the last decade. The skipjack catch dominant among species in this fishery, followed by yellowfin. The skipjack catch was

about 150,000 t until 2008, and then decreased to 90,000 t in 2011, which recovered to 140,000 t in 2012. The skipjack catch in 2014 was 95% of the 5-year average (2009-2013).

2.3 Pole-and-line

The pole-and-line is composed of three different categories, i.e., coastal (< 20 GRT), offshore (10-120 GRT) and distant water (> 120 GRT) vessels in terms of the license of this fishery. Note that some of 19 GRT type vessels obtained offshore license since 2007, which are included into offshore category in this document. The pole-and-line can be categorized into large, middle, and small sized vessels which correspond to larger than 300 GRT, 20-300 GRT and less than 20 GRT in vessel size.

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 (Fig. 6). These vessels primarily fish skipjack and albacore tunas from spring through autumn off Pacific side of Japan, and also harvest relatively small amount of 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 within the Japanese EEZ, and the trip of these vessels is shorter. On the contrary, the large vessels tend to operate farther off waters from Japan and their trips last for two to three months. Usually they primarily target for albacore from summer through autumn season in the waters north of 20˚N, and skipjack in winter and spring in the waters south of 20˚N (Fig. 6). These vessels equip a brine freezer, in which fish caught are immediately stored into a tank filled with cooled brine, and then unloads it as frozen fish.

Generally, fishing effort expressed by fishing days for offshore and distant water pole-and-line rapidly decreased from around 62,000 days in the early 1980s to around 20,000 days in 1991, increased to around 23,000 days in 2000, and then gradually decreased to 10,805 days in 2014 (Fig. 5). Total (species unspecified) catch for those fisheries rapidly decreased from around 280,000 t to around 170,000 t during the 1980s, and then gradually decreased from around 130,000 t to 80,000 t until the latest year (Fig. 5). The proportion of skipjack catch tends to decrease, from 80-87% in the 1980-1984 to 54-75% in the 2010-2014.

Fishing grounds of the pole-and-line are widely spreads ranging from 45˚N and 10˚S, from 120˚E to 170˚W. The fishing grounds were separated by around 25 degree north but more continuous than the purse seine fishing grounds (Figs. 4 and 6).

3. Recent trends for major species

3.1. Pacific bluefin (Table 2-A)

Preliminary total catch of pacific bluefin in 2014 was 9,604 t, which corresponded to 50% increase of the catch in 2013 (6,418 t) and was as same as the average of past 5 years (2009-2013: 9,590 t). Pacific bluefin catch by the purse seine and set net fluctuated largely. The catch in 2011 (13,004 t) is the largest in current years. Small pelagic purse seine (small PS), which targets age 0-1 fish, recorded the smallest catch of 763 t in 2013 after 1990s and the annual catch of this fishery in 2014 exceeded 3,000 t. 77% of total catch of small PS in 2014 were occurred in April-June and consisted of fish hatched in 2013. The length frequency for longline distributed from 150-250 cm FL which correspond to 5-25 years old were mainly caught in 2013 and 2014 (Fig. 7).

3.2. Albacore (Table 2-B)

Preliminary total catch of albacore in 2014 was 55,482 t, which was not significantly changed from the catch in 2013 (55,958 t) and was larger than the average of past 5 years (2009-2013: 52,577 t), though the value in 2014 is provisional. Albacore catch by the pole-and-line fluctuated largely, but catch by longline was comparatively stable. Fishing effort mainly targeted on albacore by middle class (20-199 GRT) and large (> 200 GRT) pole-and-line vessels fluctuated in recent years. Catch by longline in 2014 (19,355 t) was similar to the catch in 2013 (19,839 t). The length frequency for longline distributed from 60-130 cm FL, whereas much smaller fish were caught by pole and line, which distributed form 60-90 cm FL in 2013 and 2014 (Fig. 8).

3.3. Swordfish (Table 2-C)

Preliminary total catch of swordfish in 2014 was 6,168 t which correspond to 24% increase of the catch in 2013 (4,992 t) and was larger than the average of past 5 years (2009-2013: 5,526 t). Swordfish have been caught mainly by offshore and distant-water longline, which catch in 2014 was 4,368 t. The catch by coastal longline showed drastic decrease from 2,014 t in 2007 to 973 t in 2011, which is primarily due to the decrease of the number of longline boats especially in the Tohoku area, where part of boats operates night shallow sets targeting swordfish, by the Great East Japan Earthquake in 2011. The length frequency for longline distributed from 120-190 cm eye-fork length in 2013 and 2014 (Fig 9).

3.4. Striped marlin (Table 2-D)

Preliminary total catch of striped marlin in 2014 was 1,585 t which correspond to 17% decrease of the catch in 2013 (1,911 t) and was smaller than the average of past 5 years (2009-2013: 1,896 t). Total catch of striped marlin shows continuous decreasing trend since the mid-1980s primarily due to the decrease of catch of offshore and distant-water longline (from 6,378 t in 1980 to 292 t in 2014). In recent years, Japanese pelagic fisheries catch striped marlin as bycatch except for coastal driftnet and part of other longline which is seasonally targets striped marlin. The size frequency of striped marlin in 2013 showed two-mode and appearances of large numbers of small-sized fish ranged between 110-130cm eye-fork length (Fig. 10), which were mainly measured off Hawaiian water.

3.5 Blue shark (Table 2-E)

Preliminary total estimated catch of blue shark in 2013 was 12,704 t which was not significantly changed from the catch in 2012 (12,944 t). Blue shark catch by the longline fluctuated largely. The estimates of total catch had increased and reached at 27,477 t in 2010, and then had decreased since 2011 due to suffering of coastal and offshore longline fishery, who seasonally target blue shark, by the Great East Japan Earthquake in 2011. In addition to the update of the catch in 2013, most of the previous catch during 2009-2012, except for distant waters and offshore longline, were updated due to the revision of the logbook data of sharks and statistics of the spiny dog fish.

3.6. Others (Bigeye, Skipjack and Yellowfin) (Table 2-F, G and H)

Preliminary total catch of bigeye in 2014 was 21,121 t which correspond to 33% increase of the catch in 2013 (15,835 t) and was larger than the average of past 5 years (2009-2013: 19,485 t). Total catch of bigeye by Japanese fisheries showed no clear trend and longline has been the highest proportion among gears in the North Pacific.

Preliminary total catch of skipjack in 2014 was 163,871 t which correspond to 16 % decrease of the catch in 2013 (194,169 t) and was smaller than the average of past 5 years (2009-2013: 190,167 t). Most of skipjack was caught by pole-and-line and purse seine in the North Pacific. Pole-and-line catch of skipjack in 2013-2014 was 80,833 and 56,423 t respectively. Pole-and-line catch in 2014 decrease 30% of the catch in 2013.

Preliminary total catch of yellowfin in 2014 was 26,748 t which correspond to 25 % increase of the catch in 2013 (21,354 t) and was smaller than the average of past 5 years (2009-2013: 28,336 t). The yellowfin catch by purse seine has been the highest proportion among gears in the North Pacific. Purse seine catch of yellowfin in 2013-2014 was 9,251 and 14,589 t respectively.

4. Research activities

The Fishery Agency of Japan, in cooperation with the National Research Institute of Far Seas Fisheries (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 early 1990s. The tagging studies using conventional, archival and popup has been conducted by research and training vessels as well as commercial vessels. In addition, there are cooperative works with prefectural fisheries experimental stations and universities. Several cooperative studies are also on going with foreign countries.

4.1. Pacific Bluefin

4.1.1. Pacific bluefin larvae/juveniles research cruise

Since 2011, larval/juvenile surveys of Pacific bluefin have been conducted to estimate current main spawning area and period. In 2014, larval research cruises were conducted by Shunyo-Maru, Yoko-Maru, and five prefectural R/Vs. This main research area is south of Japan around Nansei Islands, where is a major spawning ground of Pacific bluefin, from 12 May to 15 July, and we found Pacific bluefin larvae in the south of Yaeyama Islands and in the southwest Miyako Island. Sea of Japan is another spawning ground of Pacific bluefin in summer (from 18 to 30 July). We operated research cruse and captured larval in the west of the Noto Peninsula and the east of Oki Islands. Spawning grounds of Pacific bluefin were estimated by simulating backward Lagrangian transportation model using compiled three years research data (2011-2013). The results suggested that Pacific bluefin start spawning late April in the west of Yaeyama Islands and east of Okinawa Main Island. After March, spawning area expanded around Yaeyama Islands to Okinawa Main Island until late July toward the end in the Nansei Islands area. While in the Sea of Japan, Pacific bluefin start spawning late June off Wakasa Bay and continue to spawn in around Noto to Oki throughout July.

4.1.2. Troll survey on age-0 Pacific bluefin

Age-0 Pacific bluefin migrate to Japanese coastal areas after June and are fished by coastal fisheries such as troll and set net. Especially, age-0 fish are captured alive for farming by trolling during the second half of the year. In order to monitor recruitment abundance of age-0 fish in a timely manner, a monitoring survey of troll fishing boats has been started since 2011 in Kochi on the Pacific side and Tsushima and Goto Islands of Nagasaki on the western side of Kyusyu Island. In this survey, we equipped troll fishing boats with data

loggers, which can collect information on location and sea temperature at a regular interval. In addition, the fishermen input catch species and number of fish to the data loggers during trolling operation. There are 61 data loggers on the 61 troll fishing boats in 6 prefectures of Mie, Wakayama, Kochi, Miyazaki, Nagasaki and Shimane in this year. In September 2014, NRIFSF published CPUE of age-0 fish in July-August obtained through this survey as a preliminary estimation on recruitment abundance of age-0 fish on the website of Fishery Agency (e.g. NRIFSF (2014)[1]).

4.1.3. Tagging for Pacific bluefin

In order to estimate the natural mortality and fishing mortality of age-0 Pacific bluefin, we conducted a conventional tagging from off Kochi prefecture since 2011 summer (July-August). A total of 3,800 fish were released, and 801 fish were recovered (21.1%) for four years. The habitat utilization and the trans-Pacific migration of age-0 Pacific bluefin were investigated using small archival tags (LAT2910, Lotek Ltd.) implanted into a fish belly from 2012 to 2014. A total of 213 individuals were released and 44 tags were recovered (20.7%). We downloaded data successfully from 26 of them (59.0%). They are expected to provide valuable information on the design of reliable recruitment monitoring survey and the precise estimation of recruitment abundance levels as well as biology of juvenile periods.

To clarify the spawning behavior and migration ecology, we also conducted a tagging survey of adult Pacific bluefin at Sado Island in the Sea of Japan. A total of 17 fish about 30 kg were attached archival tags and some of them was fitted with acceleration data-loggers from 2012 to 2015 in spring (May). Five individuals were recovered (29.4%) in the Sea of Japan after one week to nine months.

4.2. Sharks

4.2.1. Port sampling and onboard research program in Kesennuma fishing port

In 2014, size data with gender of blue shark and shortfin mako shark was collected from port sampling project in Kesennuma fishing port and onboard research program for Kesennuma offshore longline fleet between January and December. For blue shark, data from 73,174 and 8,817 individuals were collected from port sampling and onboard research, respectively. Regarding the blue shark measured in the port sampling, 76.2% of males and 61.5% of females were juveniles. For shortfin mako, data from 16,145 and 11,361

[1] NRIFSF. 2014. Preliminary report of recruitment abundance of age-0 Pacific bluefin tuna (September 2014). Available at: http://www.jfa.maff.go.jp/j/press/sigen/pdf/140930-03.pdf

individuals were collected from port sampling and onboard research, respectively. Regarding the shortfin mako measured in the port sampling, 87.0% of males and 99.9% of females were juveniles. Compared to blue shark, the ratio of adult female was small in shortfin mako. These data will be combined for the previously collected data to sketch their gender and growth specific seasonal migration patterns.

4.2.2. Research cruise

From research and training vessel cruise, catch data from 5,064 blue shark and 129 shortfin mako were obtained. In the research cruise by Taikei No.2 conducted between April and June in 2014, total of 3,357 blue shark and 128 shortfin mako were recorded. Within the cruise by Taikei No.2, whole body from 22 blue shark and four shortfin mako were retained for the biological studies including detailed measurement of body length and weight. Body size in cm (DL: dorsal length for blue shark and PCL: Pre-caudal length for shortfin mako) and gender data were collected from 969 blue shark and 89 shortfin mako (except retained specimen). Tagging was conducted for 552 blue shark and 37 shortfin mako.

In the research cruise by Shunyo Maru conducted between September and October in 2014, popup satellite archival tag (PSAT) was deployed for 22 blue shark and three shortfin mako. In September, another two PSAT were deployed for two blue shark in the research cruise by Seiyo-Maru.

4.2.3. Biological sample collection

For the estimation of life history parameters, vertebrae and/or reproductive organ from total of 236 blue sharks and 102 shortfin mako were collected from Kesennuma offshore longline fleet. For blue shark, these samples have been processed for the revision of past studies on growth and reproduction. For shortfin mako, the vertebrae are going to be used for the refinement of juvenile growth estimate.

4.3. Skipjack

4.3.1. Tagging for skipjcak

We have been conducting skipjack tagging mainly to know migration pattern to the fishing ground off Japan and its mechanism. One offshore pole-and-line vessel was chartered and tagging was conducted in the south off Japan between February and March in 2014. A total

of 320 skipjack tuna including 54 fish with archival tag (Lotek LAT2910) were released. To date one fish was recaptured. In addition, skipjack tagging has been being conducted in cooperation with Ajinomoto Co., Inc. in the coastal area of southwestern Japan since 2009. In 2014, 742 skipjack tuna including 94 fish with archival tag were released at around Yonaguni Island (24˚N, 123˚E) in March and May, and so far 16 fish including 5 fish with archival tag were recaptured.

Besides above studies, three research/training pole-and-line vessels conducted skipjack tagging in the area 11-35˚N, 134-148˚E in 2014. Total of 100 skipjack were released with the conventional tag, and 4 were recovered. By one of these vessels, collaborative study of archival tagging with NRIFSF has been being conducted since 2010. In 2014, a total of 50 and 173 archival tags were deployed in the south off Japan in February to March and around Izu Islands (central part of Japan) in May to June, respectively. To date 25 fish were recaptured. Two other collaborative studies were conducted in 2014 using other research vessels. A total of 39 skipjack tuna caught by troll were released with archival tag around Hachijo Island (33˚N, 139˚E) in May, and to date one fish was recaptured. A total of 93 skipjack tuna caught by troll were released around Bohso Peninsula (around 35˚N, 140˚E) in October, and to date one fish was recaptured.

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Table 1A. Number of Japanese tuna fishing vessels operated in the Pacific Ocean by type of fisheries and vessel size based on MAFF (1980-2006).

	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 1B. Number of Japanese tuna fishing vessels operated in the North Pacific Ocean by type of fisheries and vessel size based on logbook. Value in 2014 is provisional.

	Longline fishery					Purse seine fishery				Pole-and-line fishery			
Year	10-49 GRT	50-99 GRT	100-199 GRT	200- GRT	Total	50-199 GRT[*2]	200-499 GRT	500- GRT	Total	20-49 GRT	50-199 GRT	200- GRT	Total
2006	277	44	52	113	486	31	35	1	67	1	83	30	114
2007	279	42	48	89	458	34	36	1	71	1	77	29	107
2008	277	42	40	90	449	35	37	1	73	1	69	29	99
2009	277	38	33	81	429	33	36	3	72	1	68	28	97
2010	290	29	28	98	445	31	35	4	70	1	66	28	95
2011	274	24	25	99	422	33	36	4	73	0	63	28	91
2012	261	21	21	92	395	34	37	4	75	0	60	27	87
2013	255	20	25	87	387	34	37	4	75	0	55	25	80
2014	240	17	21	87	365	33	37	3	73	1	54	25	80

Table 2. Catch in weight (t) by species by fisheries in the North Pacific.

A. Pacific bluefin

Year	Purse seine*1		Dist. & Off. Longline*2		Coastal longline*3,4	Troll	Pole and line	Set net*5	Others*6	Total
	Tuna PS	Small PS	North Pacific	South Pacific						
2010	1,122	2,620	5	6	885	1,583	83	1,603	495	8,401
2011	2,227	6,113	9	11	828	1,820	63	1,651	283	13,004
2012	1,043	1,419	6	8	667	570	113	1,932	343	6,101
2013	2,008	763	7	7	777	904	8	1,415	529	6,418
2014	2,250	3,206	-	-	715*7	1,023	5	1,907	499	9,604

*1 Catches of the purse seine fisheries since 2002 were recalculated using the logbook data.
*2 Catches of the distant-water and offshore longline are yielded by vessels larger than 20 GRT.
*3 Catches of the coastal longline yielded by vessels smaller than 20 GRT.
*4 Catches of the coastal longline from 2007 to2012 were revised.
*5 Catch of the set net in 2013 were updated based on the Japanese official statistics of annual catch.
*6 Others fisheries include drift net, handline, trawl, other longline and unclassified fisheries.
*7 Catch of coastal longline in 2014 is provisional value and includes catch of distant water and offshore longline.

B. Albacore

Year	Longline		Pole-and-line			Driftnet	Purse seine	Troll	Setnet	Others*9	Total
	Distant Water + Offshore*8	Coastal	Distant Waters	Offshore	Coastal						
2010	3,943	17,224	15,737	3,689	135	24	330	588	42	37	41,749
2011	4,858	16,098	16,803	8,844	57	12	480	443	50	78	47,723
2012	5,160	17,668	22,710	10,940	92	26	4,193	610	48	129	61,576
2013	4,729	15,110	21,197	12,310	61	14	1,988	302	36	211	55,958
2014	(4,853)	(14,502)	(21,205)	(12,310)	(61)	(14)	(1,988)	(302)	(36)	(211)	(55,482)

*8 category distant warter + offshore LL includes training/research vessel
*9 Others include Troll catch for 1952-1994
( ) different data souce or carry over from previous year

C. Swordfish

Year	Longline			Drift net	Bait fishing	Net fishing	Trap net	Others	Total
	Distant Water + Offshore	Coastal	Others						
2010	4,240	1,158	2	494	230	0	8	110	6,241
2011*10	3,046	973	2	193	233	0	2	10	4,460
2012	2,946	1,080	4	371	288	0	8	59	4,755
2013*11	3,319	911	5	290	291	0	13	163	4,992
2014*11	4,368	1,039	5	290	291	0	13	163	6,168

*10 Some data in Tohoku area were not available due to the earthquake in 2011
*11 Catch between 2012 and 2013 are preliminary

Table 2. Continued.

D. Striped Marlin

Year	Longline			Drift net	Bait fishing	Net fishing	Trap net	Others	Total
	Distant Water + Offshore	Coastal	Others						
2010	187	832	42	913	36	-	20	26	2,056
2011*12	319	932	55	347	26	-	30	32	1,741
2012	326	980	29	597	34	-	52	33	2,051
2013*13	358	1,092	33	336	34	-	39	19	1,911
2014*13	292	832	33	336	34	-	39	19	1,585

*12 Some data in Tohoku area were not available due to the earthquake in 2011

*13 Catch between 2012 and 2013 are preliminary

E. Blue shark

Year	Longline				Large mesh driftnet	Bait fishing	Trapnet	Others	Total
	Distant Water	Offshore	Coastal	Others					
2009	7,092	12,176	1,382	716	888	1	5	15	22,274
2010	14,797	10,261	1,024	787	584	1	7	16	27,477
2011	11,390	4,210	64	859	333	3	6	3	16,867
2012	4,783	6,104	829	760	460	3	2	4	12,944
2013	4,837	5,203	1,124	622	898	2	4	14	12,704

F. Bigeye

Year	Longline	Pole-and-line	Purse seine	Gillnet	Set-net	Troll	Other	Total
2010	15,534	2,367	988	2	4	157	80	19,132
2011	17,744	2,318	1,609	1	2	141	138	21,953
2012	14,428	2,097	2,552	2	0	118	146	19,343
2013	11,735	2,446	1,421	1	5	116	111	15,835
2014	15,682	2,660	2,546	1	5	116	111	21,121

G. Skipjack

Year	Longline	Pole-and-line	Purse seine	Gillnet	Set-net	Troll	Other	Total
2010	58	82,253	113,400	315	333	4,729	205	201,293
2011	98	69,998	83,667	111	625	1,780	93	156,372
2012	165	66,243	140,900	95	404	3,487	188	211,482
2013	178	80,833	110,212	112	209	2,514	111	194,169
2014	134	56,423	104,368	112	209	2,514	111	163,871

H. Yellowfin

Year	Longline	Pole-and-line	Purse seine	Gillnet	Set-net	Troll	Other	Total
2010	9,701	4,540	11,374	22	103	3,167	421	29,328
2011	8,077	4,336	12,323	6	111	2,497	339	27,689
2012	6,482	3,651	19,317	6	113	2,279	369	32,217
2013	6,416	3,268	9,251	8	103	1,817	491	21,354
2014	6,549	3,191	14,589	8	103	1,817	491	26,748

Longline fishery

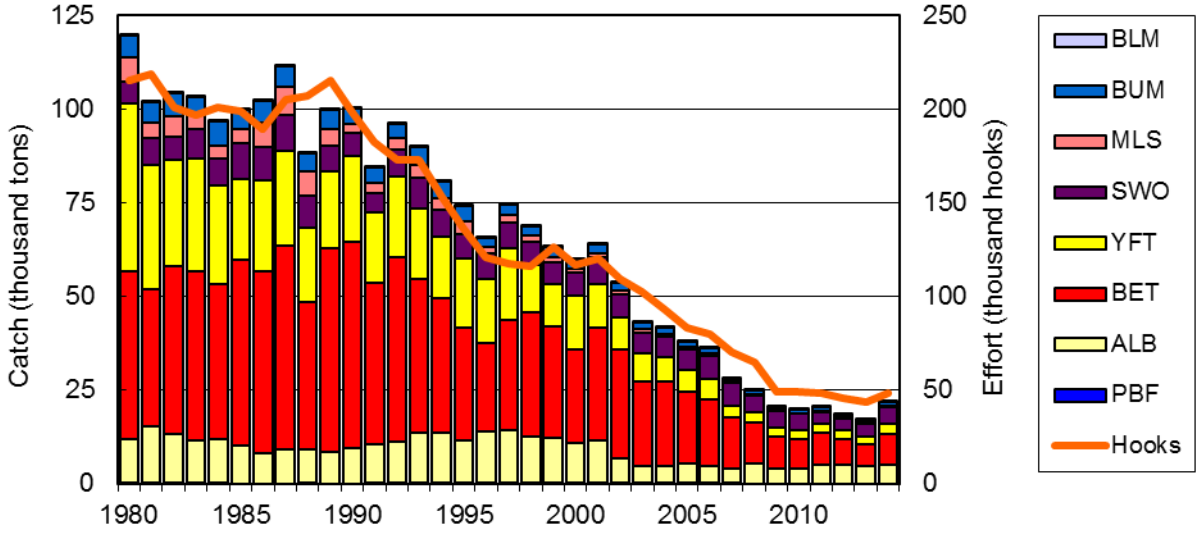

Fig. 1. Historical catches in weight (t) for major species and fishing effort (Number of hooks in million) of the Japanese distant water and offshore longline fisheries (not including small offshore fishery) in the North Pacific Ocean. PBF: Pacific bluefin, ALB: albacore, BET: bigeye, YFT: yellowfin, SWO: sword fish, MLS: striped marlin, BUM: blue marlin. Values in 2013 and 2014 are provisional.

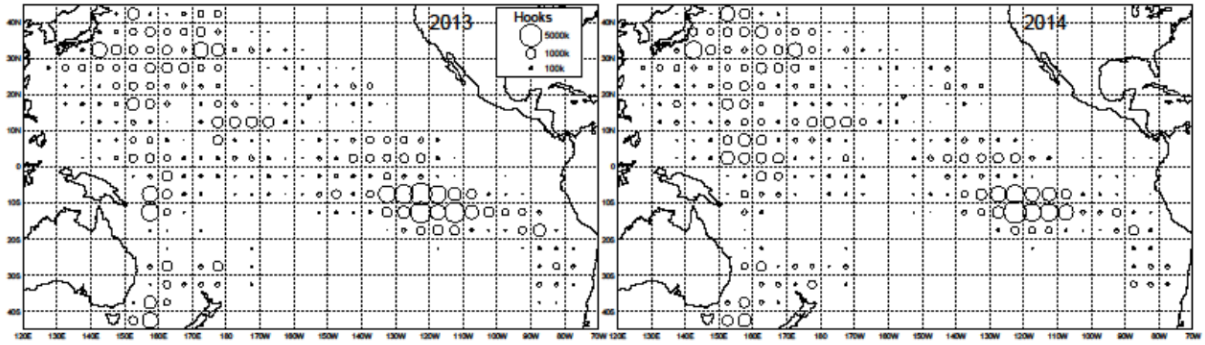

Fig. 2. Distribution of fishing effort (Number of hooks) for the Japanese distant water and offshore longline fisheries in the Pacific, 2013-2014.

Purse seine fishery

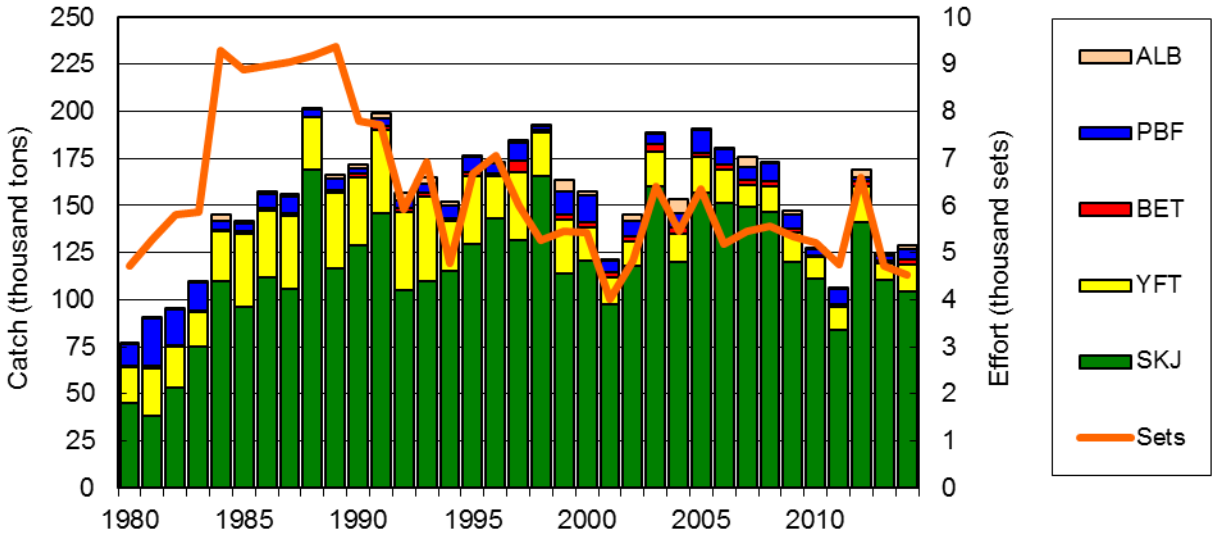

Fig. 3. Historical catches in weight (t) for major species and fishing effort (Number of sets) of the Japanese purse seine fishery in the North Pacific Ocean. SKJ: skipjack, YFT: yellowfin, BET: bigeye, PBF: Pacific bluefin, ALB: albacore. Value in 2014 is provisional.

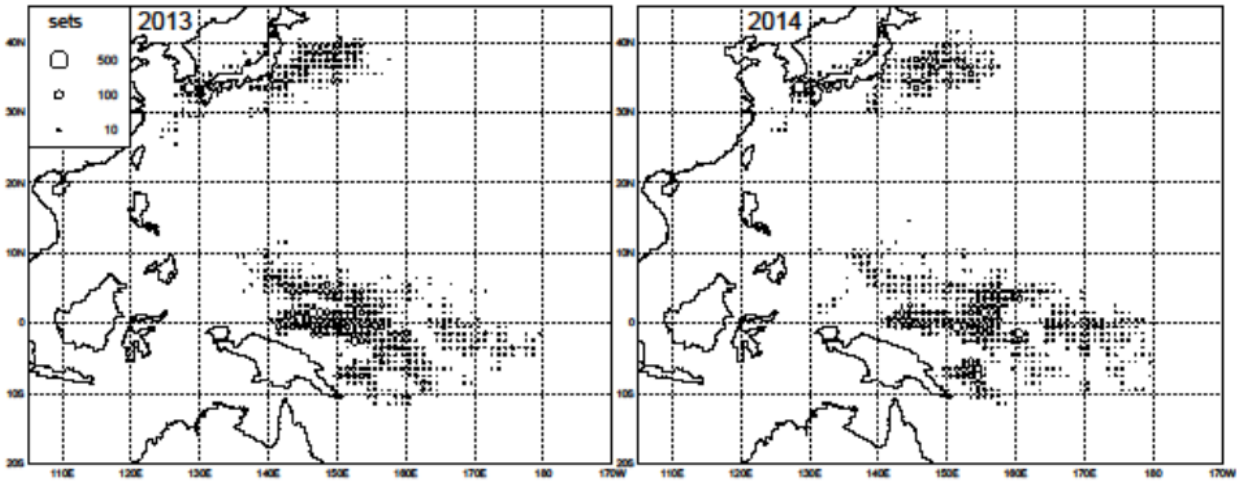

Fig. 4. Distribution of fishing effort (number of sets) for the Japanese purse seine fishery in the Pacific, 2013-2014.

Pole-and-line fishery

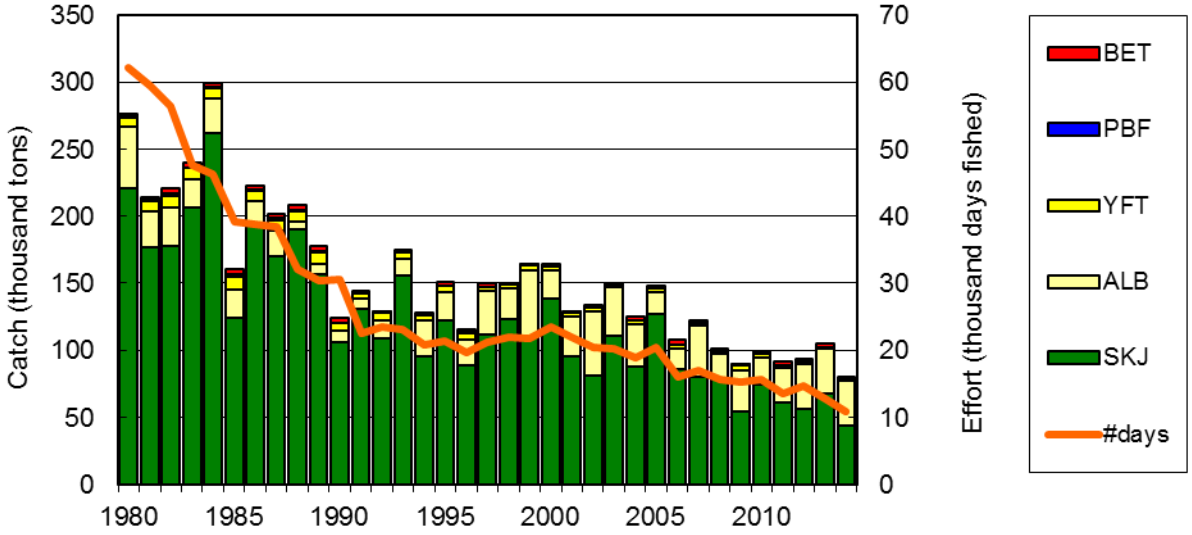

Fig. 5. Historical catch in weight (t) for major species and fishing effort (Number of fishing days) of Japanese distant water and offshore fisheries in the North Pacific. SKJ: skipjack, ALB: albacore, YFT: yellowfin, PBF: Pacific bluefin, BET: bigeye. Value in 2013 is provisional. The catch for PBF includes the catch by coastal pole-and-line (less than 20 GRT vessels) fishery. Value in 2014 is provisional.

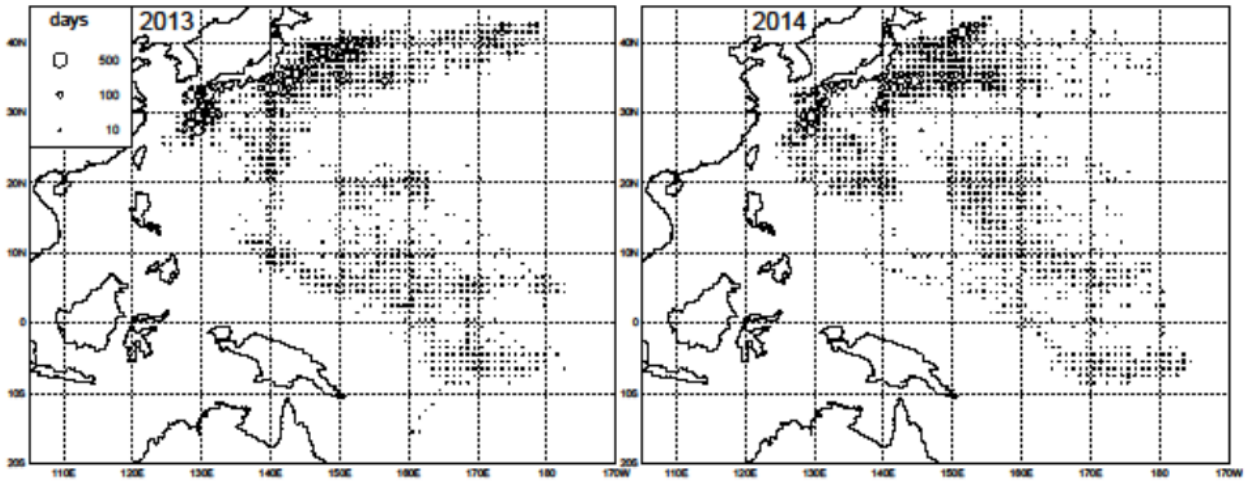

Fig. 6. Distribution of fishing effort (number of days) of the Japanese pole-and-line fishery (larger than 20 GRT vessels) in the Pacific, 2013-2014.

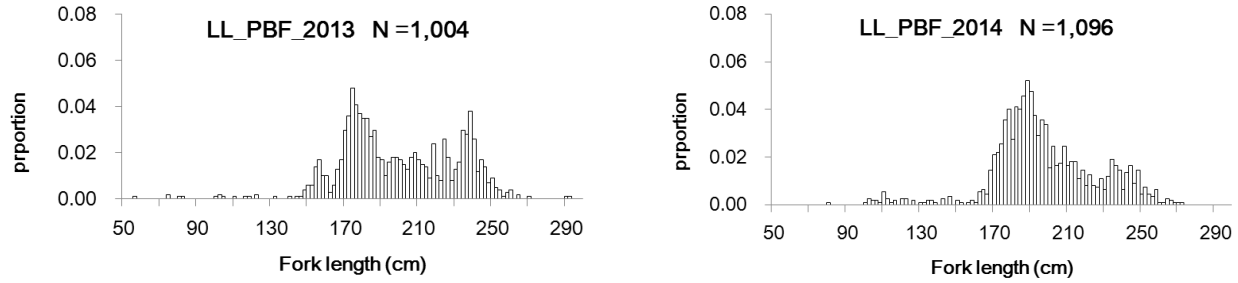

Fig. 7. Annual length frequency distribution (simply summing up all measurements) for Pacific bluefin (PBF) caught by longline in 2013 (left) and 2014 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.

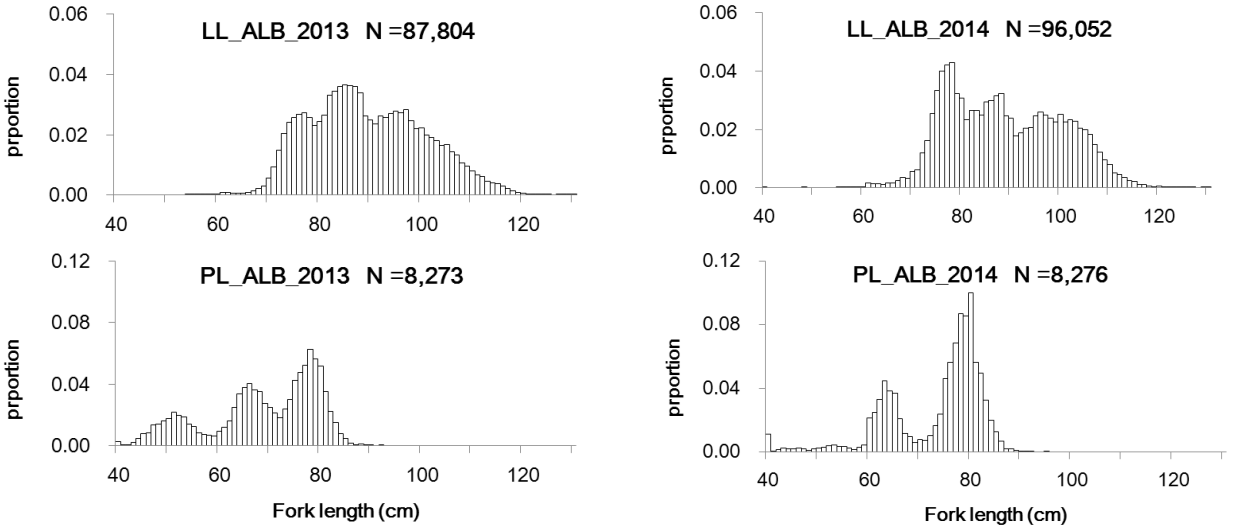

Fig. 8. Annual length frequency distribution (simply summing up all measurements) for albacore (ALB) caught by longline (upper two panels) and pole and line (lower tow panels) in 2013 (left) and 2014 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.

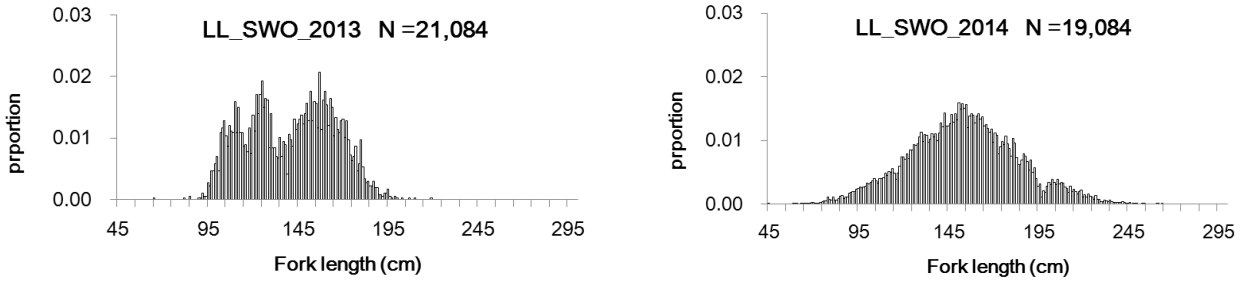

Fig. 9. Annual length frequency distribution (simply summing up all measurements) for swordfish (SWO) caught by longline in 2013 (left) and 2014 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.

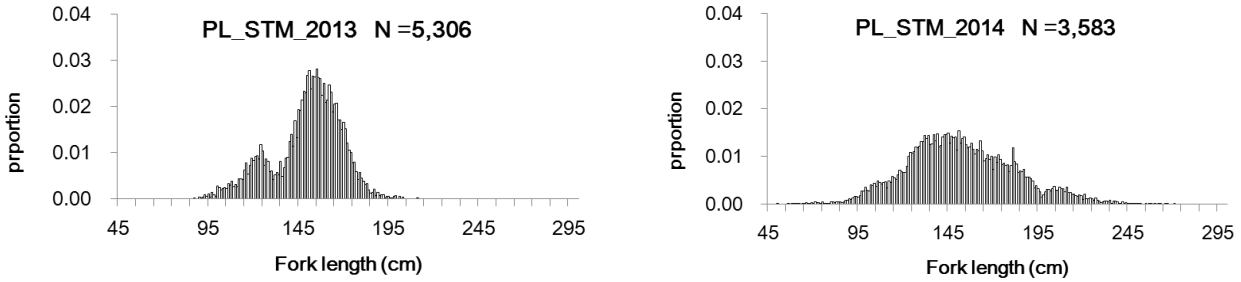

Fig. 10. Annual length frequency distribution (simply summing up all measurements) for striped marlin (STM) caught by longline in 2013 (left) and 2014 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.