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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 ISC12 (Kai et. al. 2012). The total landing of tunas (excluding skipjack) caught by Japanese fisheries in the north Pacific Ocean was 109,842 metric ton (t) in 2011 and 101,263 t in 2012. The total landing of swordfish and billfishes was 8,135 t in 2011 and 7,602 t in 2012. The landing of skipjack tuna was 153,189 t in 2011 and 175,167 t in 2012. 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 2012. The brief reports of international workshop of biological reference point and earthquake disaster reconstruction were also provided.

1. Trends in fleet size

Table 1A shows the number of Japanese tuna vessels actually engaged in fishing in the Pacific Ocean by type of fishery and by vessel size class during 1980-2006 (MAFF 1982-2012). Table 1B shows the number of Japanese tuna vessels actually engaged in fishing in the North Pacific Ocean by type of fishery and by vessel size class during 2007-2012. The number of active vessels 2007-2012 in those tables was estimated based on logbook data. Therefore some vessels which actuary operated but its logbooks were not submitted logbook were not included. The coastal longline vessels less than 20 Gross Register Tonnage (GRT), the research and training vessels of longline and pole-and-line are not included in Table 1B. Values in 2011 and 2012 are provisional in those tables.

The total number of longline vessels shows continuous declining trend since the early 1990s. The number of longline vessels of the largest size class (larger than 200 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 the number of its large longline vessels by 20% in 1998. The number of longline vessels continued to decline thereafter. Recent declining trend for larger than 50 GRT are remarkable, the number of vessels of 100-200 GRT was 21 in 2012 which is 40% of that in 2006, and the number of vessels of 50-99 GRT was 21 in 2012 which is 47% of that in 2006. 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 response to management measures adopted in the various tuna RFMOs. While the number of vessels for 20-49 GRT and 50-99 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 during the 1980-2006. The number of vessels of 10-49 GRT was relatively stable, ranging between 235 and 288 during the 2007-2012.

The total number of purse seine vessel was 78 in 2012 The larger vessels which operate mainly in the tropical waters were around 35 and have been stabilized since 1995. In contrast to longline and pole-and-line fishery, the number of purse seine vessels was relatively stable in the recent 5 years.

Regarding the pole-and-line fishery, the number of pole-and-line vessels of 50-199 GRT was 50 in 2012 which is 64% of that in 2006. The number of pole-and-line vessels for over 200 GRT also shows declining trend with the lesser extent, is 27 in 2012 which is 90% of that in 2006.

2. Catch and effort trends of the major fisheries

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 to 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 2012.

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 of catch for the coastal longline fishery is derived from Statistics Department, Minister's Secretariat Ministry of Agriculture, Forestry and Fishery (MAFF 1982-2012).

The total landing of tunas (excluding skipjack) caught by Japanese fisheries in the north Pacific Ocean in 2011 was 109,842 metric ton (t) and that in 2012 was 101,263 t which was similar to the 2011 catch. The total landing of swordfish and billfishes was 8,135 t in 2011 and 7,602 t in 2012. The landing of skipjack tuna was 153,189 t in 2011 and 175,167 t in 2012. .

2.1 Longline

Longline fisheries are classified by the type of license issued by the Government, i.e., coastal (smaller than 20 GRT and can fish only in Japanese EEZ), small offshore (10-20 GRT), offshore (10-120 GRT), and distant water (larger than 120 GRT).

Total catch of distant and offshore longline vessels in the north Pacific has been decreased (Fig. 1). Total catch was approximately 20,000 t in recent 5 years, which is 20% of that in the 1980's. Both bigeye and yellowfin were primarily caught by this fishery in the 1980's but only bigeye was dominant in recent 5 years. The number of hooks also has been decreased. The average of recent 5 years (49 million hooks) was 23% of the highest number reported in 1989. The reduction rate of total catch roughly corresponded with the reduction rate of hooks.

Annual distribution of fishing effort for longline vessels larger than 20 GRT in the Pacific Ocean in 2011 and 2012 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.

2.2 Purse seine

There are two types of purse seiners that target tunas in Japan, i.e., single and group purse seine fisheries. Historically, the group seiner consists of one purse seiner (100-200 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. On the other hand, 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, but recovered to 140,000 t in 2012. Pacific bluefin catch was fluctuated ranging from about 2,500 to 1,000 t since 1980. In the last 5 years, the Pacific bluefin catch ranged from 2,462 t in 2012 to 10,221 t in 2008.

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. Note that some of 19 GRT type vessels obtained offshore license since 2007, those are included into offshore category in this document. The pole-and-line fishery 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. 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 with ice 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 operate more offshore waters and their trips are 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 tuna in winter and spring in the waters south of 20˚N. 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 days for offshore and distant water pole-and-line fisheries 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 9,588 days in 2012 (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 70,000 t until the latest year (Fig. 5). Most of catch were occupied by skipjack ranged from 65% in 2012 and 91% in 1991.

Fishing grounds of the pole-and-line fishery 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 (Fig. 6).

3. Recent trends for major species

3.1. Pacific bluefin (Table 2-A)

Total catch of pacific bluefin in 2012 was less than 6,300 t. The annual catch limit for small pelagic fish purse seine fishery had set at 4,500 t since April 2011. Because this limit is operated according to fishing year, which starts from October and ends in September, the annual catch of purse seine in 2011 showed over 4,500 t.

Length frequency distribution for pacific bluefin caught by longline, which was measured on board or at landing port, is shown in Fig. 7. It showed wide range from 63 to 253 cmFL in 2011 and contained multiple peaks for both years.

3.2. Albacore (Table 2-B)

Total catch of albacore in 2012 was about 49,500 t, which was nearly equal to catch in 2011 and was slightly larger than the average of past 5 years, though the value in 2012 is provisional. Albacore catch by the pole-and-line fluctuated largely, but catch by longline was comparatively stable. Fishing effort by middle class (20-199 GRT) pole-and-line vessels continued to decrease in recent years, whereas that by large (> 200 GRT) vessels fluctuated. Catch by longline in 2012 (21,315 t) was similar to the catch in 2011 (20,956 t). Fishing efforts in recent 5 years by longline fishery (> 20 GRT) were decreasing, whereas the efforts of coastal longline (10-19 GRT) were stable. Trend of nominal longline CPUE differs depending on area, and shows strong declining trend in the first quarter since 2002 in the northeast Pacific. The length frequency for longline distributed from 60 cm to 120 cm FL, whereas much smaller fish were caught by pole and line, which distributed form 60 to 90 cm (Fig. 8).

3.3. Swordfish (Table 2-C)

Total catch of swordfish in 2012 by Japanese fisheries was 4,491 t. The swordfish catch by Japanese offshore and distant-water longliners shows flat trend in about 4,400 tons before 2011, and the catch since 2011 have been decreased to about 3,000 t due to the Great East Japan Earthquake in March 2011. The catch by Japanese coastal longliners is also continuously decreased during 2008-2012. This supposed to be at least partially caused by the decrease of the number of coastal longline boats (Table 1B). Preliminary report of the year book in 2012 informed that the swordfish catch by Japanese coastal large mesh drift net in 2012 is increased to about 300 tons from 189 t in 2011. This is because many drift-netters resumed their operations in 2012 which were ceased by the Great East Japan Earthquake in the previous year.

The length frequency of swordfish shows the appearance of the notable mode in around 100 cm EFL in 2011 (Fig. 9). Though the size sampling activities ceased during 11th of March to autumn in 2011 due to the suffering of the Great East Japan Earthquak, this should indicates

the emergences of strong year class.

3.4. Striped marlin (Table 2-D)

Total catch of striped marlin by Japanese fisheries was 1,471 t in 2012. Japanese coastal large mesh drift net fishery caught the large portion of the Japanese catch of striped marlin. Their catch have continuously decreased from about 1,300 t in 2008 to 333 t in 2011, which was the historical lowest catch because most of drift-netters ceased their operations since the earthquake. The catch in 2012 was slightly recovered after many survived drift-netters resumed their fishery. The catch by Japanese coastal longliners fluctuated between 450 and 700 t between 2008 and 2012, while the catch by Japanese offshore and distant-water longliners were between 150 and 400 t.

The size frequency of striped marlin in 2011 showed an appearances of large numbers of juveniles (Fig. 10), which were mainly measured by the training vessels off Hawaiian water and were similar to the Hawaiian size frequency (ISC 2012). Due to the Great East Japan Earthquake, the size frequency data in 2011 were not fully covered the fish caught by the commercial fisheries.

3.5 Blue shark (Table 2-E)

Japanese government provided the landing data as species-combined shark catch in the year book (MAFF 1982-2012) and these data does not include release or discard information. Thus the annual catches including live release and dead discard were estimated using carefully conducted statistical analysis using information by unloaded catches and efforts in the logbooks of commercial boats, observer records and research surveys under the ISC shark WG for stock assessment of North Pacific blue shark. The trend of estimated catches were stable between 16,000 t and 20,000 t during 2007 and 2010 but dropped in 2011 due to the suffering of offshore longlineres seasonally targeting blue shark by the Great East Japan Earthquake.

3.6. Others (Bigeye, Skipjack and Yellowfin)

Total catch of bigeye by Japanese fisheries was 16,124 t in 2012 (Table 2-F). Most of this species were caught by longline and the amount of bigeye catch by longline were decreasing in recent 5 years.

Total catch of skipjack were gradually decreasing from 238,747 t in 2008 to 153,189 t in 2011 then increased 175,167 t in 2012 (Table 2-G). Most catch were occupied by Ploe-and -line and Purse seine. The lowest catch by these two fisheries were in 2012 for Pole and line and in 2011 for Purse seine within 2008-2012.

For yellowfin, total catch in 2012 was 29,362 t (Table 2-H). The catch by purse seine has been the highest proportion of yellowfin and the catch by this fishery was 17,427 t which is the highest in recent 5 years.

4. Research activities

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 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. PBF larvae/juveniles research cruise

In 2012, research cruises were conducted for ecological study of larval/juvenile PBF by R/V Syoyo-Maru, Shunyo-Maru, Yoko-Maru, Tenyo-Maru, and six prefectural R/Vs. Larval surveys were conducted in the south of Japan around Nansei Islands area, which is a major spawning ground of PBF, from 7 May to 26 July and found that PBF larvae was abundant in the south of Yaeyama Islands and in the area between Miyako Island and Okinawa-Main Island. Larval surveys were conducted also in the Sea of Japan, which is another spawning ground of PBF, from 2 July to 5 September, however only two PBF larvae were captured in the east of Oki Islands. This information would be utilized to estimate spawning grounds of PBF by simulating backward Lagrangian trans-port. The previous studies suggest that PBF larvae hatched around Nansei Islands are transported to the Kuroshio Current area as they grow. To elucidate the oceanographic relationship between the distribution of PBF juveniles and the Kuroshio, distribution of PBF juveniles were studies nearby Yakushima Island from 22 May through 29June in 2012 by the pelagic trawls. In total, 78 individuals of PBF juveniles (FL: 11.4-109.8 cm) were captured mainly in the Kuroshio Current and its northern edge region in the west Yakushima, where north-eastern ward Kuroshio Current turns to the east. The results well correspond to the prediction by the juvenile migration model of PBF, which suggest that some of PBF juvenile migrate across the Kuroshio off-west of Yakushima Island toward the Sea of Japan, while some migrate to the east toward the Pacific coast of Shikoku and Honshu.

4.1.2. Troll survey on age-0 PBF

NRIFSF has enforced to conduct timely-monitoring of recruitment strength of age-0 PBF for the purpose of management of this species in recent year. Age-0 PBF at two to three months hatched in May and June migrate to coastal areas on the Pacific side of the western Japan and

Tsushima and Goto Islands in the East China Sea and are captured alive for farming in these regions. A monitoring survey of fishing boat of troll fishery targeting the age-0 PBF has been started since 2011 in Kochi on the Pacific side and Tsushima and Goto Islands. Main purpose of this survey is to obtain quick estimation on recruitment abundance of age-0 fish from the fishery for farming before the fishing season during the period of winter to spring. Data loggers, which can collect information on location and sea temperature at a certain interval and include species and number of fish caught during operation, are equipped on 14 and 10 fishing boats in Kochi and Nagasaki, respectively. The troll survey introduced by Kai et al (2012) has limitations of time and space, although it has an aspect of fishery-independence. On the other hand, this survey can cover broad area and collect contiguous data. In this year, this survey will be deployed in Oki Islands in Shimane from September through December when age-0 PBF at two to five months old migrates around this region with installation of the data loggers on 10 fishing boats. Consequently, this survey will be able to monitor the quick estimation of recruitment abundance of age-0 fish hatched in both spawning periods such as May-June (Nansei-Island) and July-August (Sea of Japan).

4.1.3. Tagging for age-0 PBF

Natural and fishing mortality of juvenile (age-0: about 20cm in fork length (FL)) PBF in the off Kochi prefecture will be investigated using conventional tagging during three summers (2011-2013).

A total of 2,710 fish were released, and 672 fish were recovered to date. In addition, the habitat utilization of the juvenile PBT in coastal nursery areas was investigated using small archival tags implanted in a fish during August in 2012 for 75 individuals. Thirteen tags were recovered in total (recovery rate 17%) and we downloaded data successfully from four of them (5%). 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 PBF.

4.2. Sharks

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

In 2012, size data with gender of blue shark and shortfin mako shark was collected from port sampling project in Kesennuma and onboard research program for Kesennuma offshore longline fleet. The main fishing ground was the area north of 20°N and west of the dateline. For blue shark, size data from 96,493 and 19,063 individuals were collected from port sampling and onboard research, respectively. For shortfin mako, size data from 10,312 and 6,880 individuals were collected from port sampling and onboard research. Both juvenile and adults were observed almost equally for blue shark in both sexes, while juvenile dominated for shortfin mako in both sexes. These data will be combined for the previously collected data to

sketch their sex and growth stage specific seasonal migration patterns.

4.2.2. Research cruise

From research and training vessel cruise, catch and size data from 2,899 blue shark and 89 shortfin mako sharks were obtained. For improvement of conversion factor of blue shark, biological sampling and fine-scale measurement were conducted for 133 individuals.

4.2.3. Tagging for shortfin mako shark

To investigate the migration pattern and underwater behaviors of large sized adult shortfin mako sharks in the northwestern Pacific which are rarely caught by longline gears, NRIFSF tentatively attached two PSAT tags on large shortfin mako caught by Japanese training vessels in February 2012. One of them were successfully transmitted 3 months of data. Further tag attachments are now planned.

4.3. Skipjack

4.3.1. Tagging for skipjcak

To investigate migration to the fishing grounds of skipjack around Japan, the tagging was conducted by pole-and-line and troll vessels in the subtropical and temperate zone. In 2012 and 2013, a total of 11,352 fish with conventional tag and 596 fish with archival tag were released, and so far a total of 444 fish including 20 fish with archival tag were recaptured.

5. International workshop on biological reference points

NRIFSF organized the workshop on biological reference points (BRPs) for fisheries management under environmental changes, in Shimizu from June13-14, 2013, supported by Fisheries Agency of Japan. The objectives of this workshop are to review various BRPs for fish stocks including tuna and other fish species and to discuss the appropriate BRPs for temperate tunas considering the characteristics of biology and fishery for these species, environmental and ecosystem, and socio-economic effects. Twelve topics were presented and three issues about BRPs relating to the case studies, regime shifts, and ecosystem services were discussed in the general discussion. Further information of the workshop will be available on the web site (http://fsf.fra.affrc.go.jp/2013workshop/report.pdf).

6. Earthquake disaster reconstruction

Following the mega-earthquake on March 11th, 2011, tsunami hit the east coast of Japan, destroying a number of major fishing ports including Kesennuma, Ishinomaki, and Ofunato. The comparison between before and after the Great East Japan Earthquake (before: total of Jun-Feb 2011 and Mar 2010, after; total of Jun-Mar 2013) showed that the recovery rate for the amount of fisheries landing was 71% (40,000 t) in Iwate, Miyagi and Fukushima

prefectures (FAJ 2013). Due to the tunami attack, 319 fishing port were damaged but 36% reconstructed completely and 47% were partially. For the distributive processing facilities, about 70% of those destroyed by the disaster resumed their services. A total of 29,000 fishing boats were damaged but 15,000 fishing boats were restored at March 2013.

References

MAFF (1982-2012): Gyogyou yousyokugyou seisan toukei nenpou (Yearbook of fisheries and aquaculture production statistics of Japan for 1980-2012, Statistics Department, Minister's Secretariat, Ministry of Agriculture, Forestry and Fishery.

ISC (2012): ISC12 Plenary Report, Sapporo, Japan, Annex 5. REPORT OF THE BILLFISH WORKING GROUP WORKSHOP. 6-16 December 2011. Honolulu, Hawaii, USA.

FAJ (2013): The influence and support for fishery by the Great East Japan Earthquake: revival situation of fisheries. http://www.jfa.maff.go.jp/j/sinsai/pdf/joukyou.pdf (In Japanese).

Kai, M., Nakano, H., Okamoto, H., Minami, H., Oshima, K., Sato, K., Fujioka, K., Uosaki, K., Yokawa, K., Abe, O., Matsumoto, T and Takeuchi, Y (2012): National report of Japan. ISC/12/Plenary/08. 19pp.

Table 1A. Number of Japanese tuna fishing vessels operated in the Pacific Ocean by type of fisheries and vessel size based on MAFF (1982-2012).

	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 2012 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
2007	279	42	48	89	458	35	35	1	71	1	77	29	107
2008	277	42	40	90	449	37	35	1	73	1	69	29	99
2009	277	38	33	81	429	35	34	3	72	1	68	28	97
2010	290	29	28	98	445	33	33	4	70	1	66	28	95
2011	271	24	25	99	419	39	33	4	76	0	62	28	90
2012	235	21	21	87	364	40	34	4	78	0	50	27	77

Table 2. Catch in weight (t) by species by fisheries in the North Pacific. Values in 2012 are provisional.

A. Pacific bluefin

Year	Longline[*1]		Purse Seine[*2]		Troll[*3]	Pole and Line	Set Net	Others[*4]	Total
	Distant Water + Offshore	Coastal	Tuna PS	Small PS					
2008	19	1,476	3,029	7,192	2,377	64	2,358	1,192	17,707
2009	8	1,304	2,127	5,950	2,003	50	2,236	913	14,591
2010	5	903	1,122	2,620	1,583	83	1,047	918	8,281
2011	9	933	2,227	6,113	1,820	63	1,957	654	13,775
2012[*5]	-	594	1,043	1,419	570	113	1,765	779	6,283

*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 The troll catch since 1998 includes catch for farming.
*4 Others fisheries include drift net, handline, trawl, other longline and unclassified fisheries.
*5 Catch of the coastal longline in 2012 is provisional value, including catch of the distant water and offshore longline.

B. Albacore

Year	Longline		Plole-and-Line			Driftnet	Purse seine	Troll	Setnet	Others	Total
	Distant Water + Offshore (>20GRT)[*6]	Coastal (<20GRT)	Distant Waters	Offshore	Coastal						
2008	5,415	13,677	9,873	9,152	35	1,531	825	549	101	34	41,192
2009	3,820	18,175	17,779	13,302	91	149	2,076	410	33	43	55,878
2010	3,943	17,224	15,737	3,689	135	24	330	588	42	37	41,749
2011	4,858	16,098	16,804	8,844	57	12	480	443	50	78	47,724
2012	(5,025)	(16,290)				(12)	(480)	(443)	(50)	(78)	(49,494)

*6 category distant warter + offshore LL includes training/research vessel
( ) different data source or carry over from previous year

C. Swordfish

Year	Longline			Drift net	Bait fishing	Net fishing	Trap net	Others[*7]	Total
	Distant-water + offshore	Coastal	Others						
2008	4402	1785	2	648	349	0	3	173	7363
2009	4400	1536	1	682	249	0	3	239	7110
2010	4240	1084	2	483	230	0	8	110	6156
2011[*8]	3046	870	2	189	233	0	2	10	4352
2012[*8]	3243	648	0	300	200	0	0	100	4491

*7 Other fisheries include trolling and harpoon but majority of catch obtianed by harpoon
*8 Catch between 2011 and 2012 are preliminary, and some data in Tohoku area were not available due to the earthquake in 2011

Table 2. Continued.

D. Striped Marlin

Year	Longline			Drift net	Bait fishing	Net fishing	Trap net	Others[*7]	Total
	Distant-water + offshore	Coastal	Others						
2008	390	609	10	1302	28	-	26	43	2408
2009	166	451	21	821	39	-	17	34	1550
2010	187	641	42	899	36	-	20	26	1850
2011[*8]	319	698	55	333	26	-	30	32	1493
2012[*8]	314	558	0	500	0	0	100	0	1471

*7 Other fisheries include trolling and harpoon but majority of catch obtianed by harpoon

*8 Catch between 2011 and 2012 are preliminary, and some data in Tohoku area were not available due to the earthquake in 2011

E. Blue shark

Year	Longline				Large mesh driftnet	Bait fishing	Trapnet	Others	Total
	Distant Waters	Offshore	Coastal	Others					
2007	5,644	10,651	1,885	752	1,185	2	5	36	20,160
2008	4,973	8,210	1,469	757	1,212	1	8	23	16,653
2009	4,738	9,140	1,270	657	888	1	6	15	16,715
2010	9,633	7,826	958	737	584	1	7	16	19,762
2011	5,836	586	181	779	333	4	5	3	7,726

F. Bigeye

Year	Longline	Pole-and-line	Purse seine	Gillnet	Set-net	Troll	Others	Total
2008	20,202	1,573	2,750	13	3	138	77	24,756
2009	17,748	1,561	1,560	7	5	115	93	21,089
2010	15,476	2,367	988	2	4	157	80	19,074
2011	17,474	2,204	1,461	1	2	141	138	21,421
2012	12,005	1,429	2,409	1	2	141	138	16,124

G. Skipjack

Year	Longline	Pole-and-line	Purse seine	Gillnet	Set-net	Troll	Others	Total
2008	98	86,633	146,974	332	315	4,178	217	238,747
2009	51	62,425	120,348	324	274	3,819	278	187,518
2010	58	82,253	111,090	315	333	4,729	205	198,982
2011	98	68,907	81,574	111	625	1,780	93	153,189
2012	188	45,282	127,089	111	625	1,780	93	175,167

H. Yellowfin

Year	Longline	Pole-and-line	Purse seine	Gillnet	Set-net	Troll	Others	Total
2008	7,321	3,432	13,425	23	94	2,436	425	27,155
2009	7,051	5,016	16,007	12	86	2,534	335	31,041
2010	9,677	4,540	11,363	22	103	3,167	421	29,292
2011	8,036	4,285	11,513	6	111	2,497	339	26,788
2012	6,043	2,939	17,427	6	111	2,497	339	29,362

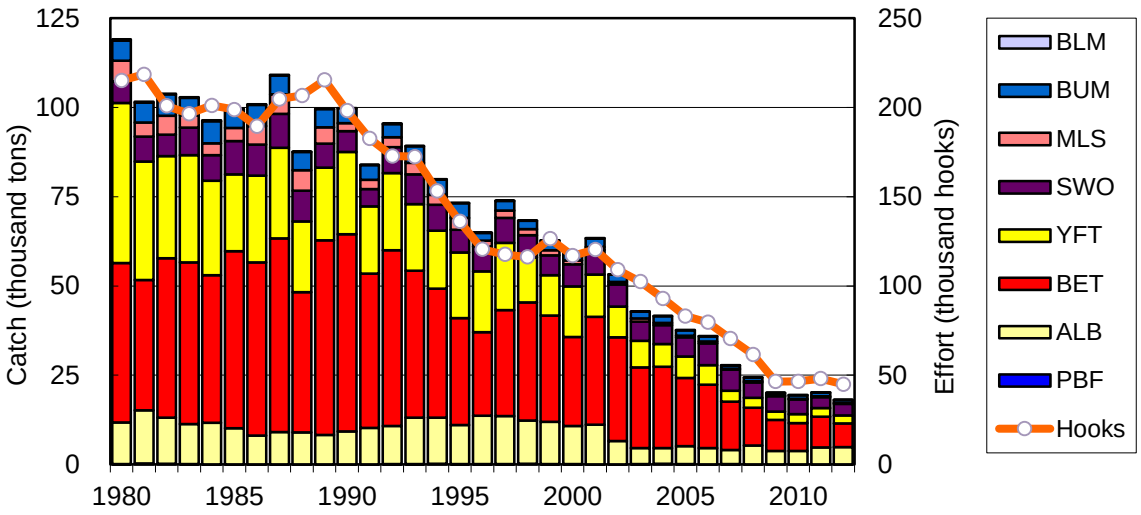

Fig. 1. Historical catches in weight (t) for major species and fishing effort (Number of hooks in million) of the Japanese distant water and offshore longline fishery (not including small offshore) in the North Pacific Ocean. PBF: Pacific bluefin, ALB: albacore, BET: bigeye, YFT: yellowfin, SWO: sword fish, MLS: striped marlin, BUM: blue marlin. Value in 2012 is provisional.

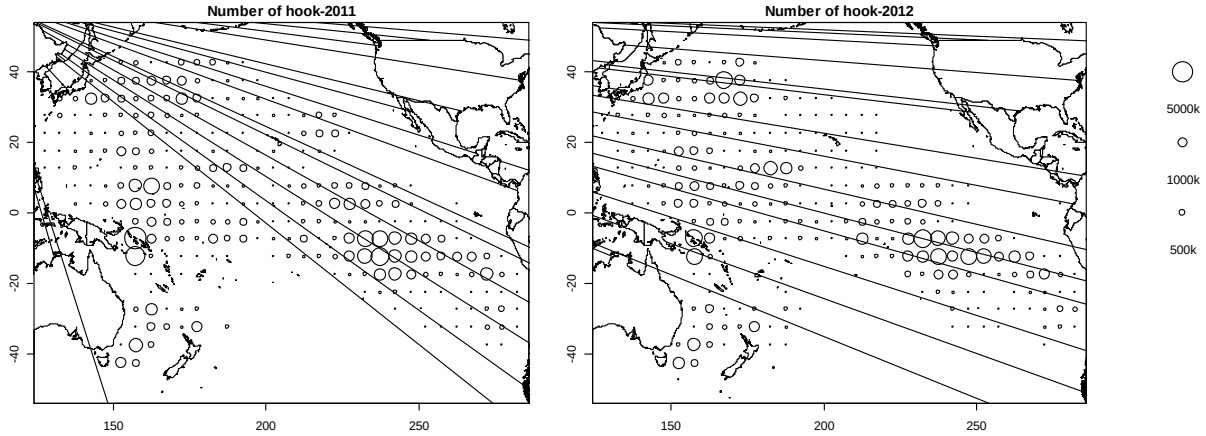

Fig. 2. Distribution of fishing effort (Number of hooks) for the Japanese longline fishery (larger than 20 GRT vessels) in the Pacific, 2011-2012.

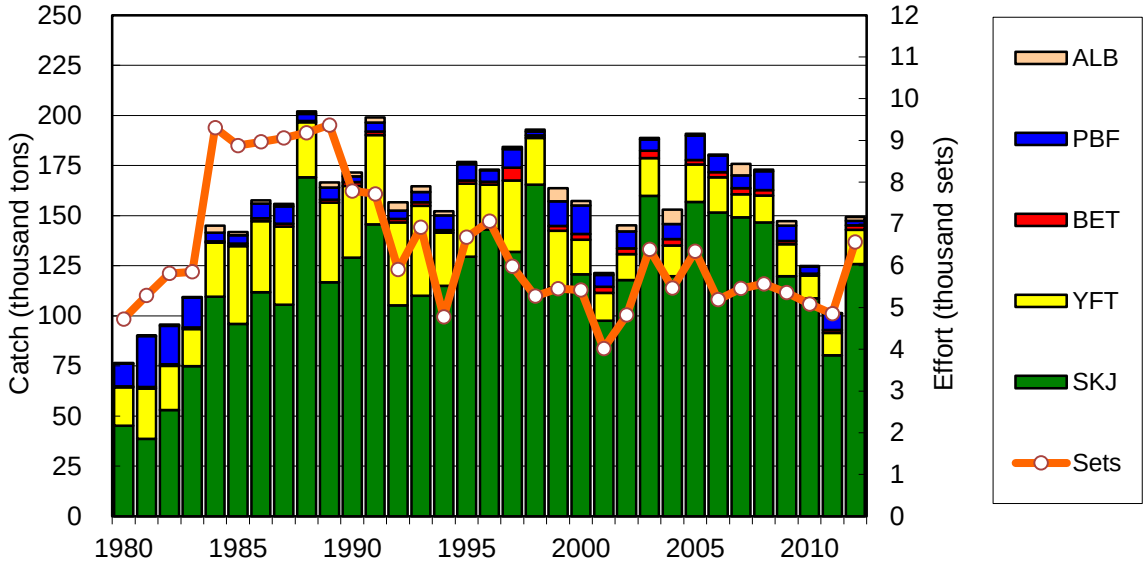

Fig. 3. Historical catches in weight (t) for major species and fishing effort (Number of sets) of the Japanese purse seine fishery in the Pacific Ocean. SKJ: skipjack, YFT: yellowfin, BET: bigeye, PBF: Pacific bluefin, ALB: albacore. Value in 2012 is provisional.

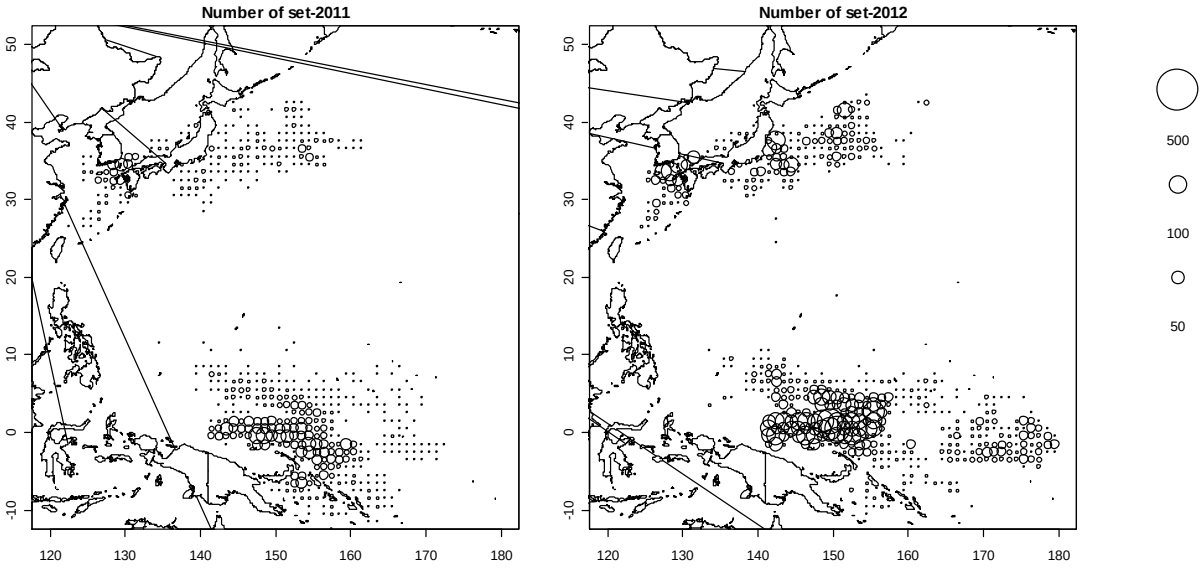

Fig. 4. Distribution of fishing effort (number of sets) for the Japanese purse seine fishery in the Pacific, 2011-2012.

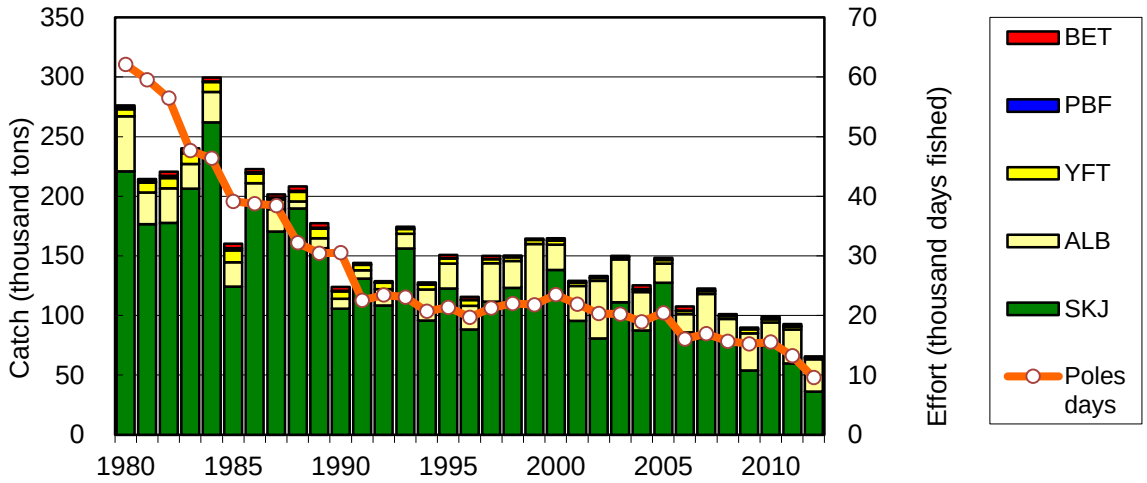

Fig. 5. Historical catch in weight (t) for major species and fishing effort (Number of poles·days) of Japanese distant water and offshore fisheries in the north Pacific. SKJ: skipjack, ALB: albacore, YFT: yellowfin, PBF: Pacific bluefin, BET: bigeye. Value in 2012 is provisional. The catch for PBF includes the catch by coastal pole-and-line (less than 20 GRT vessels) fishery.

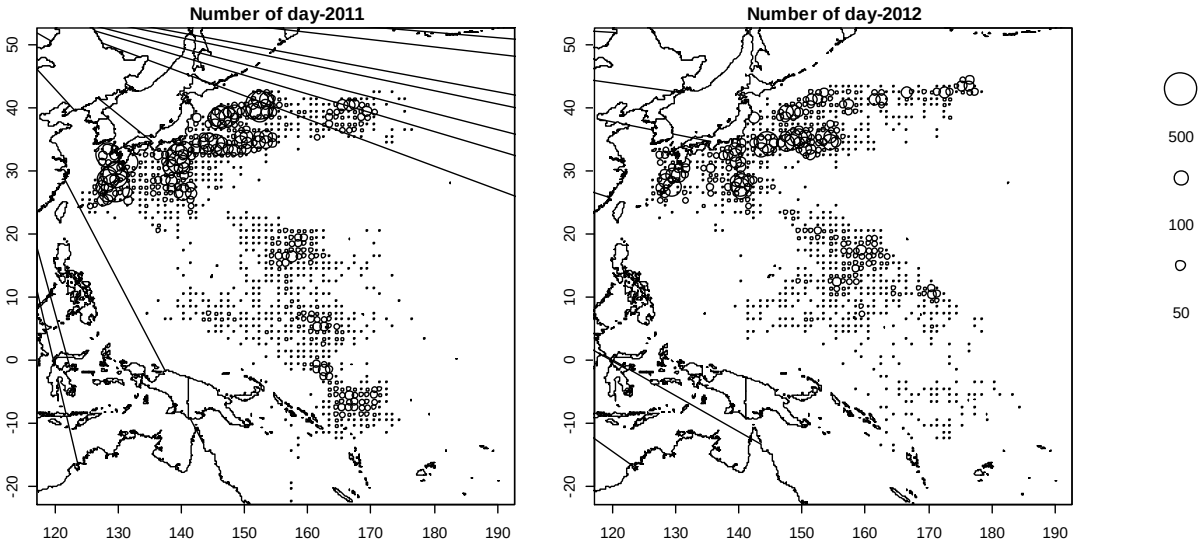

Fig. 6. Distribution of fishing effort (number of days) of the Japanese pole-and-line fishery (larger than 20 GRT vessels) in the Pacific, 2009-2011.

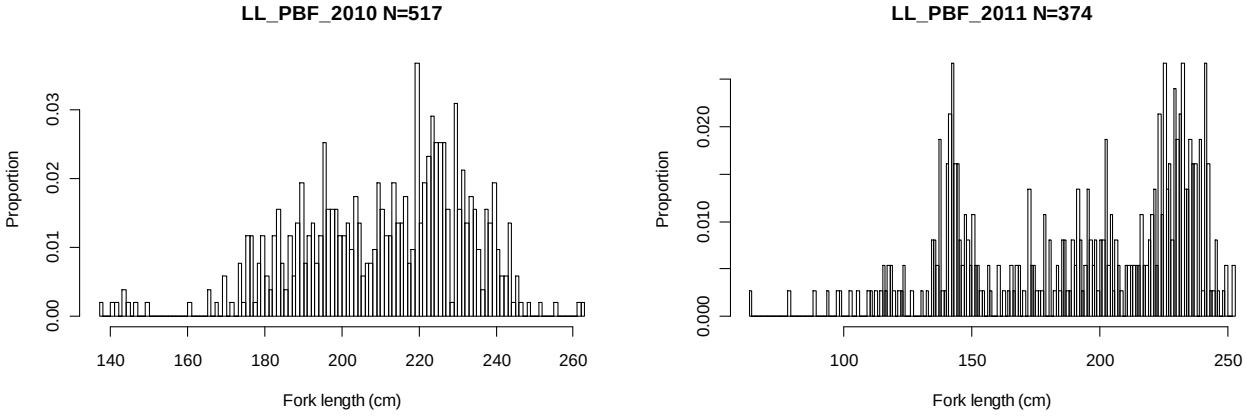

Fig. 7. Annual length frequency distribution (simply summing up all measurements) for pacific bluefin caught by longline in 2010 (left) and 2011 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.

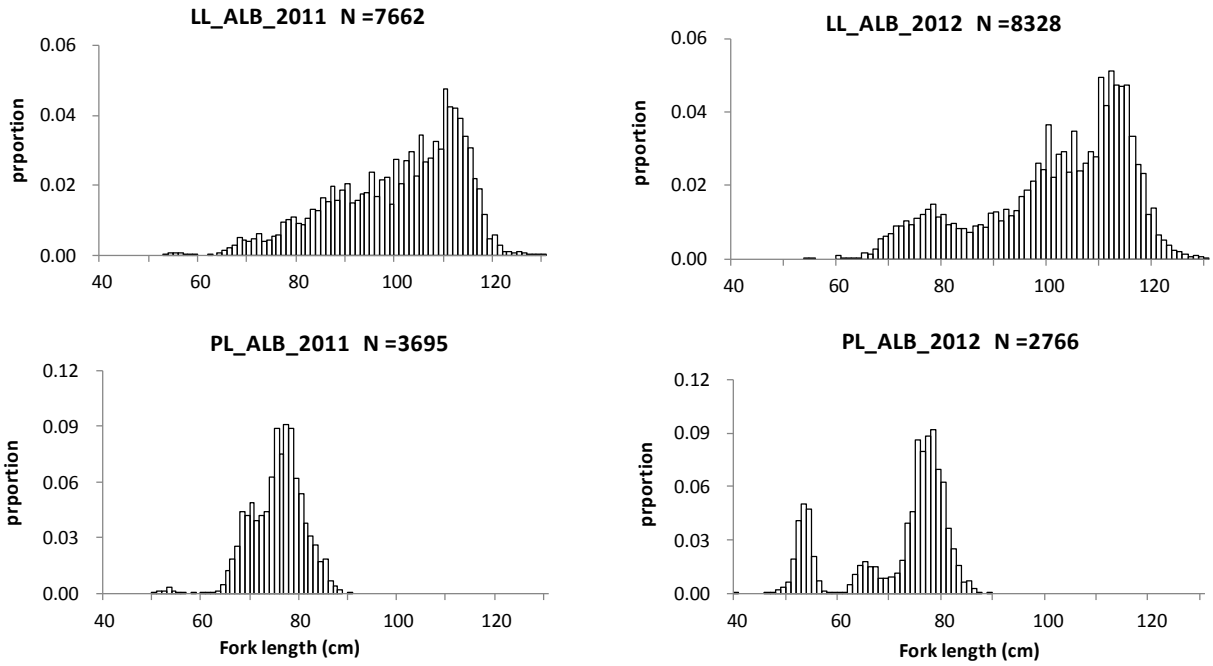

Fig. 8. Annual length frequency distribution (simply summing up all measurements) for albacore caught by longline (upper two panels) and pole and line (lower tow panels) in 2011 (left) and 2012 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.

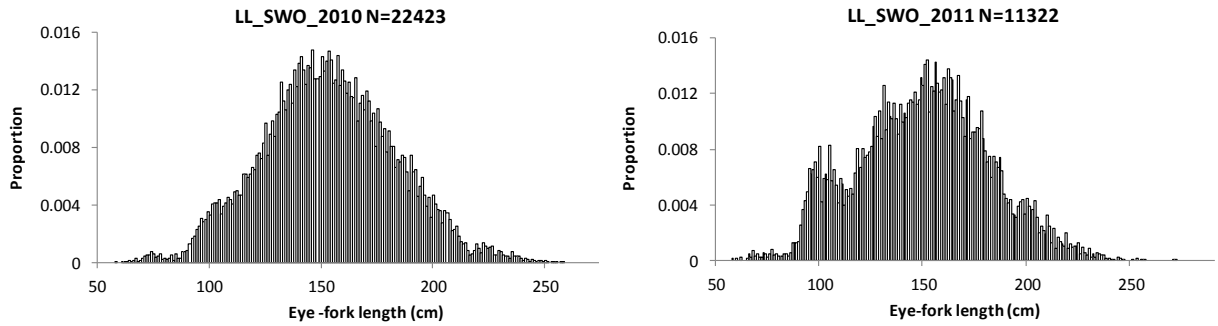

Fig. 9. Annual length frequency distribution (simply summing up all measurements) for swordfish caught by longline in 2010 (left) and 2011 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.

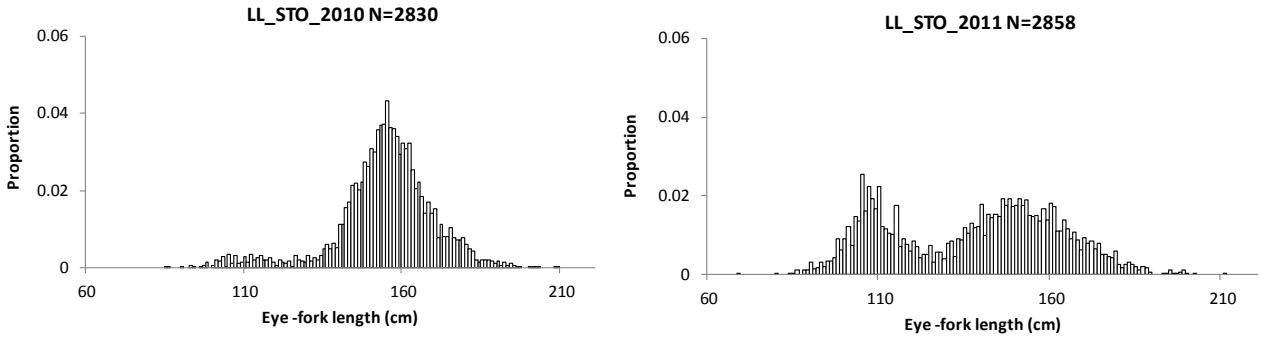

Fig. 10. Annual length frequency distribution (simply summing up all measurements) for striped marlin caught by longline in 2010 (left) and 2011 (right). Texts in each graph indicate gear, species, year, and the number of fish measured.