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National Report of the Republic of Korea[1]

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Abstract

Korean fisheries fishing for tunas and tuna-likely species in the North Pacific are distant water tuna longlines (DWLL) and distant water tuna purse seines (DWPS). Domestic fisheries, offshore large purse seine, setnet and troll, are also involved in the catch of Pacific bluefin tuna in the EEZ. As Korea is a member of both WCPFC and IATTC, DWLL and DWPS have been fishing in the RFMO areas of competence, south of 20°N. These fisheries are managed by the Distant Water Fisheries Development Act. Domestic fisheries have stepped into the management by the Ministerial Directive with regard to bluefin tuna in the EEZ since 26 May 2011.

Total catches of distant water fisheries in the North Pacific declined from 117,943 t in 2003 to 39,055 t in 2011. Longline catch was 15,254 t in 2011, which was 23.1 % decrease from the peak in 2004. Purse seine catch was 23,801 t in 2011. This was 76.4% decline from the peak in 2003. In longline catch, bigeye, yellowfin, swordfish, blue marlin, albacore and stripe marlin were 60.0%, 21.0%, 6.4%, 1.0%, 0.6% and 0.3% in 2011, respectively. In purse seine catch, skipjack, yellowfin and bigeye tuna were 77%, 22.1 % and 1 % in 2011, respectively. Longline fishing efforts decreased from 42,485 thousand hooks to 33,147 thousand hooks in 2011 but showing slight increasing trend during the past 5 years. Purse seine fishing efforts decreased from 2,876 sets in 2003 to 771 sets in 2011. Longline fishing efforts were higher in the central area and the eastern area, while purse seine efforts were concentrated on the western areas in 2011.

Pacific bluefin tuna catch by offshore large purse seiners declined from 1,196 t in 2010 to 670 t in 2011. This was 53.3 % of the average catch of the last 5 years. In 2011, the catch occurred throughout year with the highest of 100-140 t in May and June but less than 10 t from July to November. They were all juvenile mostly with a mode of 35-55 cm. The catches were distributed in the South Sea centering round Jeju Island throughout the year and their centering occurred in the southeastern sea in winter in 2010 and 2011.

In accordance with the Ministerial Directive put into effect in 26 May 2011, as first step to monitoring and management of Pacific bluefin tuna in Korean waters, the 134 individuals (94.4 kg, 25.0-40.0 cm in length) caught from troll fishery targeting Spanish mackerels and yellowtails and the 103 individuals from setnets were reported to transferred to fattening farms in 2011.

Introduction

The 55 year-old Korean distant water tuna longline fishery that stepped up the first fishing in the Indian Ocean in 1957, has explored the Pacific Ocean since 1958 and the Atlantic Ocean since 1967. The high-seas and within the coastal states in the South Pacific have been the main fishing grounds for Korean longline fishery and tuna purse sein fishery as well. In early years, longliners based at foreign ports near the fishing grounds but became to use home ports as they have been equipped with deep freezing facilities since 1972. All longline vessels have based on home ports in since 1999. This change gave advantages in exporting the products to Japanese markets and some others. In domestic markets, tuna SASHIMI demands have been increasing year by year.

Korean tuna purse seine fishery was initiated by accessing into the Eastern Pacific fishing ground with 3 vessels in 1971. Helicopter-aided mass operations were introduced in 1979 for the first time and the number of vessels increased to 28 as of the end of 2011. Most of the catches are supplied to the packers for our domestic consumption, and the remainders are being exported to foreign canneries.

Korean distant water fisheries are managed by the Distant Water fisheries Development Act put into effect on the 4 February, 2008. Currently, over 90% of Korean catch of tuna and tuna-like species have been harvested in the Pacific ocean, of which about 10% of purse seine catches and 44% of longline catches were attributed to those from the north Pacific south of 20°N for the past 5 years.

Pacific bluefin tuna has been caught throughout the year by domestic fleet, mostly by the offshore large purse seiners targeting pelagic species such as mackerels within the EEZ. The data and information on this species have been rarely available until 2009 when the WCPFC adopted the CMM 2009-07 that later replaced by the CMM 2010-04. Accordingly, Korea established the Ministerial Directive effective in 26 May 2011, as first step to monitoring and management of Pacific bluefin tuna in Korean waters.

This report provides the information on the Korean distant-water tuna fisheries in the North Pacific Ocean and Pacific blue tuna catch in Korean EEZ by domestic fleet.

Data collection and handling

Distant water tuna purse-seining and longlining are Korean fisheries to fish for tuna and tuna-like species in the Pacific Ocean. Fishing companies report the catches of their vessels to the Korea Overseas Fisheries Association (KOSFA). The fishing vessels submit monthly the logbook that contain catch and effort and the length measurement to the National Fisheries Research and Development Institute (NFRDI). NFRDI is cross-checking the data of both total catch compiled by KOSFA and the catch and effort data.

Korean Distant water tuna purse seine and longline fisheries statistics for North Pacific Ocean are derived from the whole Pacific Ocean based on the logbook.

Due to data paucity of Pacific bluefin tuna statistics by domestic fleet in Korean waters

before 26 May 2011, bluefin tuna catches for 1982-1999 were Japanese import records of Korean bluefin tuna, those of 2000-2004 were the Korean export data to Japanese markets obtained from Korean offshore large purse seine fisheries cooperatives, and from 2005 to 2011, the monthly sale slips of Busan Cooperative Fish Market compiled by the NFRDI. Furthermore, bluefin tuna catches of 2005-2011were revised on the basis of Yoo *et al*. (2011) and those of 2000-2004 based on Yoo *et al*. (2012).

Information on distant water fisheries

1. **Fleet structure**

The North Pacific Ocean is an integral part of the Pacific Ocean fishing ground of Korean distant water tuna purse seine and longline fisheries in both the WCPFC and the IATTC areas of competence south of 20°N. All the vessels registered to both RFMOs are engaging in fishing for tuna and tuna-like species in the North Pacific Ocean. The number of vessels by gear active in the Pacific Ocean is presented in Fig. 1 and table 1. The number of purse seine vessels, once peaked at 39 in 1990, has been reduced to the present level of 28 in 2011. 12 vessels were of 500-1000 class, 11 vessels of 1000-1500 class and 5 vessels of over 1500 class. The number of longline vessels, once culminated at 220 in 1991, has also been reduced to 108 in 2008 but slightly increasing to 122 in 2010 and 124 in 2011. All longline vessels were in the class of 201-500 GRT with deep freezing facilities.

2. Annual catch and effort

Annual catch and effort by gear and primary species in the North Pacific are tabulated in table 2, 3 and Fig. 2 and 3. Total catches declined from 117,943 t in 2003 to 39,055 t in 2011. The catch portion of the North Pacific to the entire Pacific was 43.9% in longline fishery and 10.5% in purse seine fishery. The catches occurred in the areas south of 20°N. Longline catch was 15,254 t in 2011, which was 23.1 % decrease from the peak in 2004. Purse seine catch was 23,801 t in 2011. This was 76.4% decline from the peak in 2003. In longline catch, bigeye, yellowfin, swordfish, blue marlin, albacore and stripe marlin were 60.0%, 21.0%, 6.4%, 1.0%, 0.6% and 0.3% in 2011, respectively. Bigeye slightly declined, yellowfin slightly increased and swordfish and black marlin slightly increased, compared to the catch of past 10 years. In purse seine catch, skipjack, yellowfin and bigeye tuna were 77%, 22.1 % and 1 % in 2011, respectively. Skipjack catch in 2011 was 20.7% of the peak in 2003 and yellowfin tuna was 32.1% of the peak in 2002. Longline fishing efforts decreased from 42,485 thousand hooks to 33,147 thousand hooks in 2011 but have been slightly increasing trend during the past 5 years. Purse seine fishing efforts decreased from 2,876 sets in 2003 to 771 sets in 2011.

3. Fishing pattern

Catch and effort by gear are mapped in Fig. 4 and 5. Korean tuna longline fishing efforts were higher in the central area and the eastern area, while purse seine fishing efforts were

concentrated on the western areas in 2010 and 2011. Purse seining has generally been operating in the tropical area of the Western and Central Pacific between 140°E-180°E and, when oceanographic conditions were favorable, it extended farther to the east. It was remarkable that it most inclined to the west in 2011, while longline efforts were deployed relatively higher in both the central and the eastern areas. These fishing patterns were quite comparable to those of the previous years, especially in 2009 when they were high in the central area with an extension farther to the east.

Information on bluefin tuna catch in Korean EEZ by domestic fleet.

1. Offshore large purse seine fishery

The annual and monthly catch of bluefin tuna catch are presented in Table 4 and Fig. 6 and 7. The catch of Pacific bluefin tuna by offshore large purse seiners declined from 1,196 t in 2010 to 670 t in 2011. This was 53.3 % of the average catch of the last 5 years. The number of offshore large purse seiners was 25 in 2011 and continuously decreasing from 48 in 1994 by virtue of the fishing capacity control by the government. The catches were 100-140 t, the highest, in May and June, 40-80 t from December to April, and less than 10 t from July to November.

Quarterly distributions of fork length of PBF were presented in Fig. 8. Almost all were juvenile. While, in quarter 1, 2 and 4, there was one mode with the range of 35-55 cm, quarter 3 has a different shape with the range of 34-72 cm and 3 modes.

The catch distribution is shown in Fig. 9. The catches were distributed in the South Sea centering round Jeju Island throughout the year and their centering occurred in the southeastern sea in winter in 2010 and 2011.

2. Coastal troll fishery

In accordance with the Ministerial Directive put into effect in 26 May 2011, anyone who wish to catch bluefin tuna for fattening farming were obliged to get the approval by the regional government. Coastal troller targeting Spanish mackerels and yellowtails were approved in 2011. These were 14 vessel (3.0-7.9 G/T) in Kyeong-nam Province and 71 vessels (1.0-9.2) in Jeju Province. The catches were presented in Table 5. 134 individuals (25-40 cm, 0.25-1.85 kg) were caught by coastal trollers in 2011, which were all transferred to the fattening farms.

Data collection system

Tuna catch statistics of Korea distant water tuna fisheries (DWLL and DWPS) are obtained from two way of data reports. Fishing companies report the catch of their fishing vessels to Korea Distant water Fisheries Association (KOSFA) every month. Fishing vessels monthly submit in electronic format to National Fisheries Research and Development Institute (NFRDI)

the logsheet that contains the fishing operational informations, including catch and effort and the length data. All data collection and reporting requirements adopted by tuna RFMOs were reflected in the Revised Distant-water Fisheries Act put into effect in July 2012 and, accordingly, the NFRDI improved fisheries data collection capable of data cross-checking to provide the data in accurate and timely manner.

In accordance with the Ministerial Directive for conservation and management of Pacific bluefin tuna in the Korean EEZ, effective in 26 may 2011, anyone who wish to catch for PBF in Korean EEZ should obtain the approval from the regional government, and catch statistics should be provided to the NFRDI. The NFRDI is developing the data collection protocol and system.

Research activities

The NFRDI has a plan to carry out tagging survey for PBF migration in Korean waters. It carried out the data collection and biological sampling in the landing port of Busan and the verification of PBF catch data (number of box used in auction, actual weight of catch/box by size, detailed catch data from daily sale slips, etc.) in order to obtain the better PBF catch data by offshore large purse seiners since 2010.

NFRDI begun with studies related to the farming operations for bluefin tuna since 2007. 103 individuals (3kg/ind.) collected from coastal setnets were transferred to the fattening cage at sea experiments being carried out by the Southwest Sea Fisheries Research Institute of NFRDI in 2011.

References

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Yoo J.T., Z.G. Kim, S. I. Lee, I. J. Yeon, S. C. Yoon and D.W. Lee. 2012. Recent update of Pacific bluefin tuna catch in Korea waters. ISC/12-1/PBFWG/19.

Table 1. The number of Korean vessels by gear and size, actually operating in the Pacific Ocean, 2007-2011

Year	GRT class by gear									
	Longline					Purse seine				
	Total	0-50	51-200	201-500	500+	Total	0-500	501-1,000	1,001-1,500	1,500+
2007	122	-	-	122	-	28	-	14	13	1
2008	108	-	-	108	-	28	-	15	12	1
2009	111	-	-	111	-	27	-	13	11	3
2010	122	-	-	122	-	28	-	13	13	3
2011	124	-	-	124	-	28	-	12	11	5

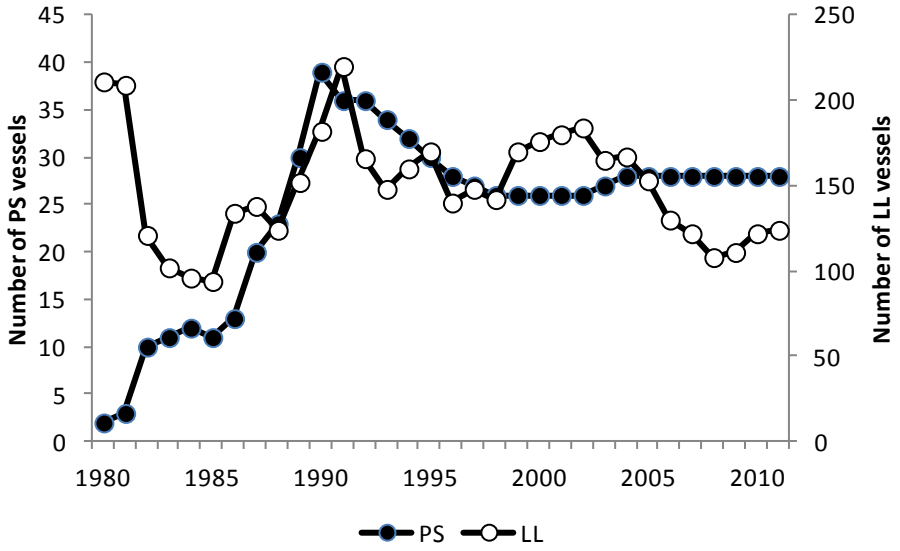

Fig. 1. The annual number of fishing vessels of the Korean tuna distant-water fishery in the Pacific Ocean.

Table 2. Number of hooks (1,000 hooks) and catch (tons) of tuna and tuna-like species by the Korean distant-water longline fishery in the North Pacific during 2002-2011. Data for 2011 is provisional

Year	No.of hooks (1,000)	Albacore	Yellowfin tuna	Bigeye tuna	Skipjack	Blue Marlin	Striped Marlin	Sword fish	Black Marlin	Sailfish	Others	Total
2002	33,507	112	3,137	10,786	0	152	188	439	479	123	1,400	16,816
2003	42,485	146	4,741	9,739	6	159	206	381	819	129	931	17,256
2004	38,240	78	5,145	12,468	101	227	75	410	919	1	404	19,827
2005	28,687	420	2,958	9,257	35	304	136	404	997	0	823	15,333
2006	37,741	135	5,096	11,494	0	217	56	465	1,063	0	941	19,468
2007	27,136	137	2,175	9,606	0	121	47	453	887	0	291	13,717
2008	32,292	405	2,678	10,868	0	215	29	775	709	0	686	16,365
2009	27,306	101	2,987	10,723	0	223	22	967	642	0	883	16,550
2010	28,155	109	1,990	9,422	0	254	18	676	574	0	526	13,569
*2011	33,147	87	3,204	9,121	0	683	49	975	158	1	976	15,254

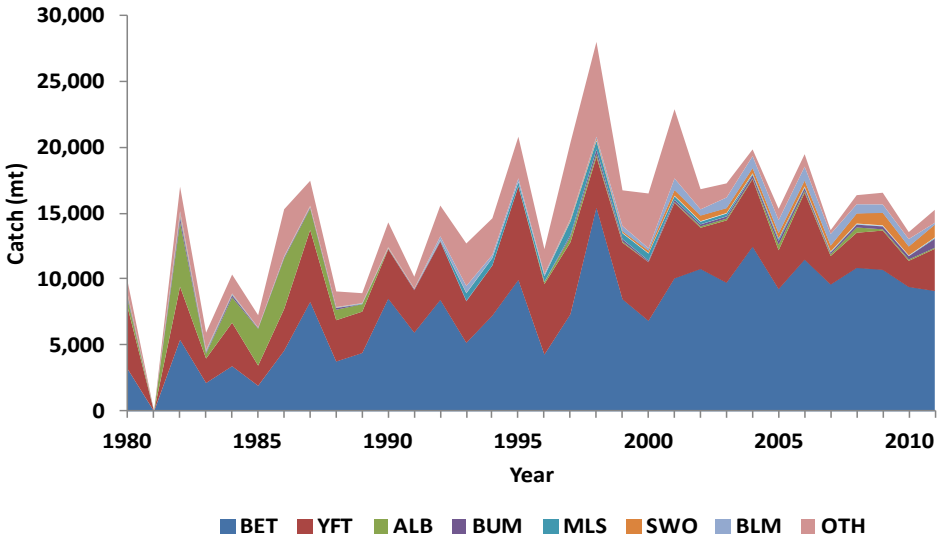

Fig. 2. Annual catch of Korean distant-water longline fishery by primary species in the North Pacific for 1980-2011.

Table 3. Fishing effort (sets) and catch (tons) of tunas by the Korean distant-water purse seine fishery in the North Pacific during 2002-2011. Data for 2011 is provisional

Year	No. of sets	Skipjack tuna	Bigeye tuna	Yellowfin tuna	Others	Total
2002	2,537	64,897	0	16,389	0	81,286
2003	2,876	88,654	319	11,715	0	100,687
2004	1,633	43,797	48	7,426	0	51,271
2005	1,035	49,724	0	11,027	0	60,751
2006	510	67,564	13	15,394	0	82,970
2007	544	18,270	0	3,585	0	21,855
2008	492	9,269	4	7,842	0	17,114
2009	1,249	38,644	15	7,201	0	45,860
2010	732	20,997	366	4,040	0	25,403
*2011	771	18,329	216	5,256	0	23,801

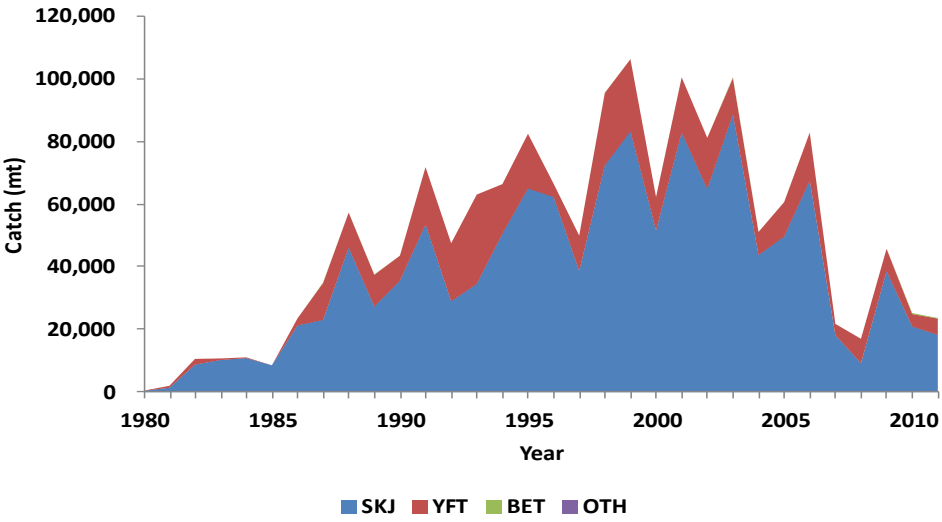

Fig. 3. Annual catch of Korean distant-water longline fishery by primary species in the North Pacific during 1980-2011.

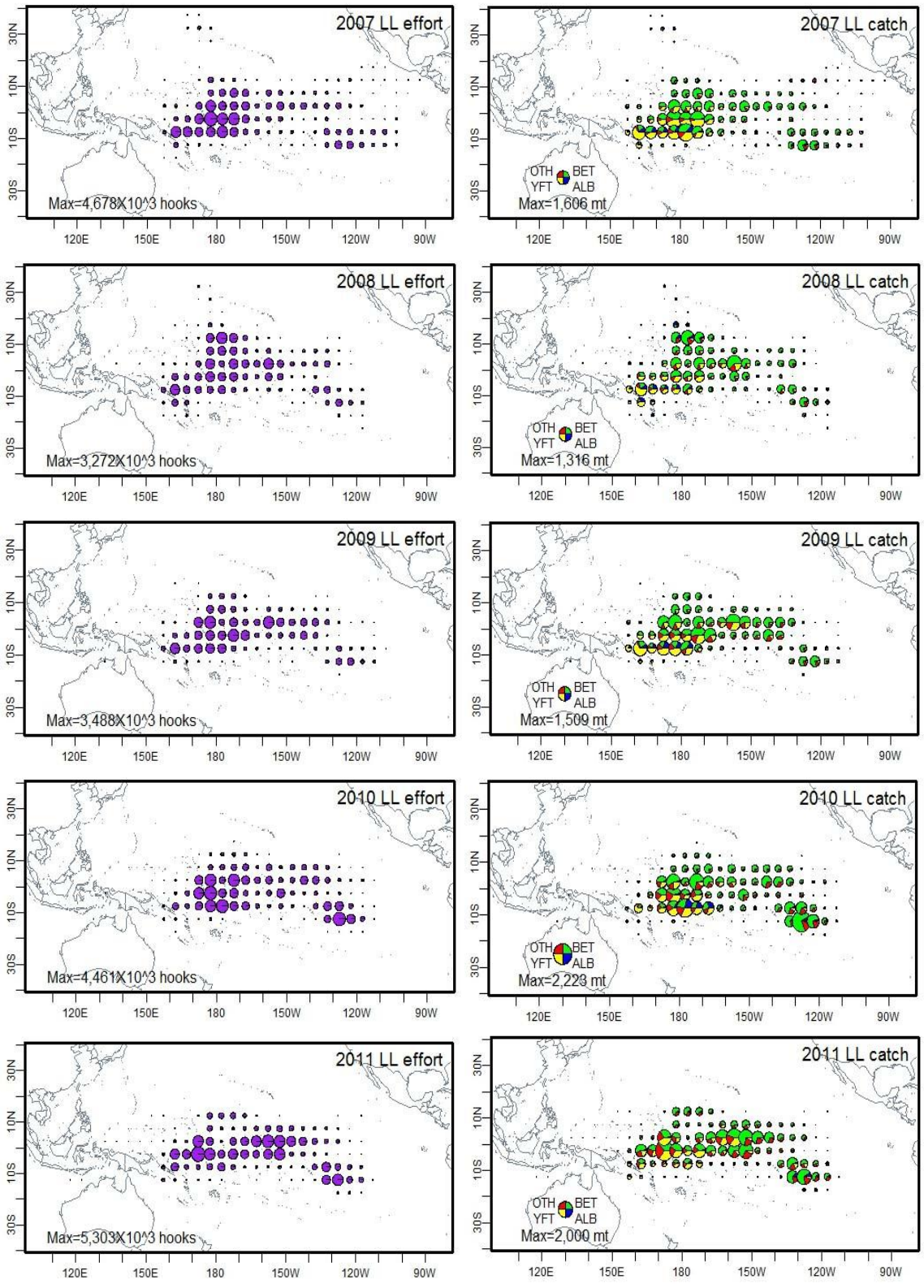

Fig. 4. Annual catch and effort distributions of target species by Korean distant-water longline fishery operating in the Pacific Ocean, 2007-2011.

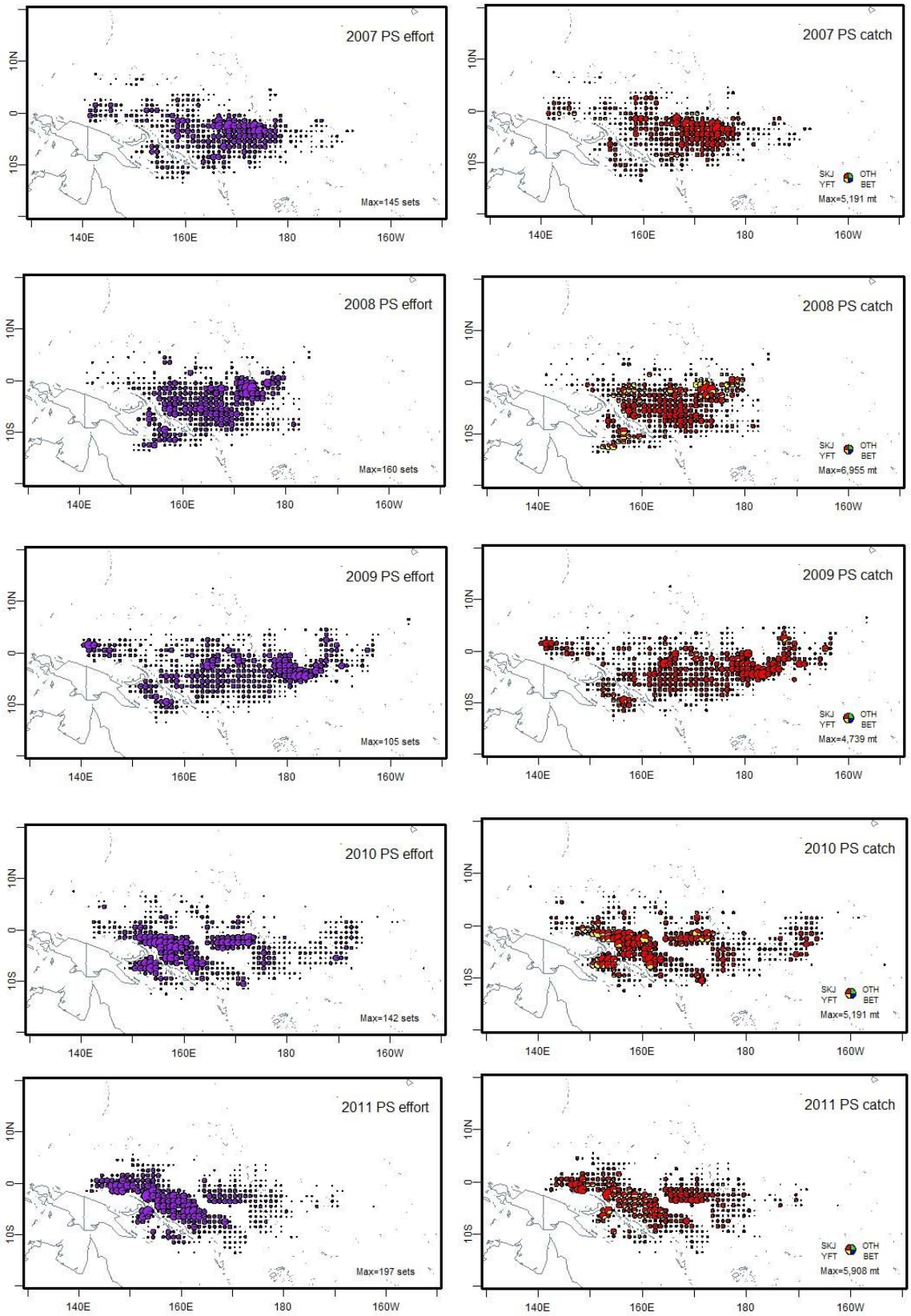

Fig. 5. Annual catch and effort distributions of target species by Korean purse seine fleets operating in the Pacific Ocean, 2007-2011.

Table 4. Annual catch of Pacific bluefin tuna by offshore purse seine fishery in Korea (unit : tons)

Year	Gear type	Permitted number of fleets	Existing Catch	The converted Catch	Data source
1982	(ps)*[1]	48	31		Import data of Japan
1983	(ps)	48	13		
1984	(ps)	48	4		
1985	(ps)	48	1		
1986	(ps)	48	344		
1987	(ps)	48	89		
1988	(ps)	48	32		
1989	(ps)	48	71		
1990	(ps)	48	132		
1991	(ps)	48	265		
1992	(ps)	48	288		
1993	(ps)	48	40		
1994	(ps)	48	50		
1995	(ps)	36	821		
1996	(ps)	36	102		
1997	(ps)	36	1,054		
1998	(ps)	36	188		
1999	(ps)	36	256		
2000	ps	32	1,976	2,401	Export data to Japan
2001	ps	32	968	1,176	
2002	ps	32	767	932	
2003	ps	29	2,141	2,601	
2004	ps	29	636	773	
2005	ps	29	1,085	1,318	Sale slips at Busan Cooperative Fish Market
2006	ps	29	833	1,012	
2007	ps	29	1,054	1,281	
2008	ps	29	1,536	1,866	
2009	ps	27	794	936	
2010	ps	25	1,021	1,196	
*[2]2011	ps	25	529	670	

*1: Gears were unknown during 1982-1999, but probably purse seine.

*2 : Data for 2011 are provisional

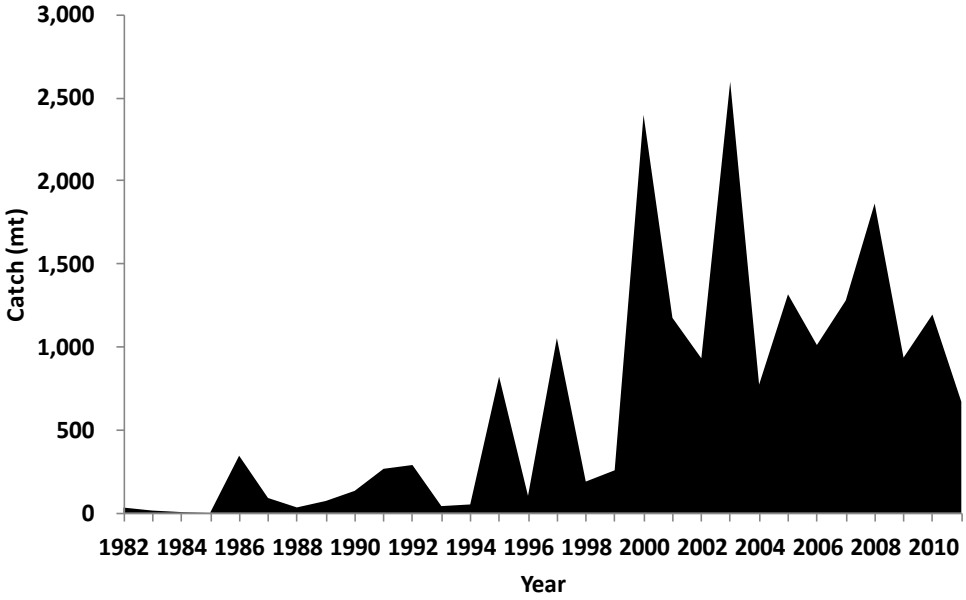

Fig. 6. Annual catches of PBF caught by offshore large purse seine fishery from 1982 to 2011.

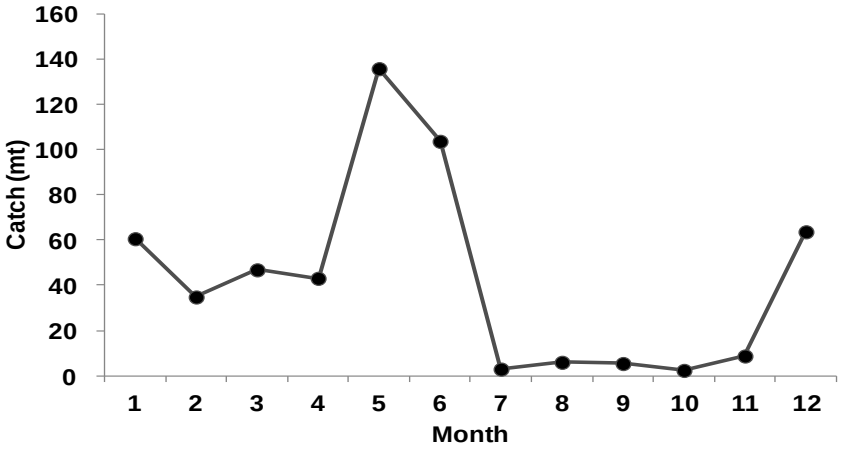

Fig. 7. Monthly catches of PBF caught by offshore large purse seiners in 2011.

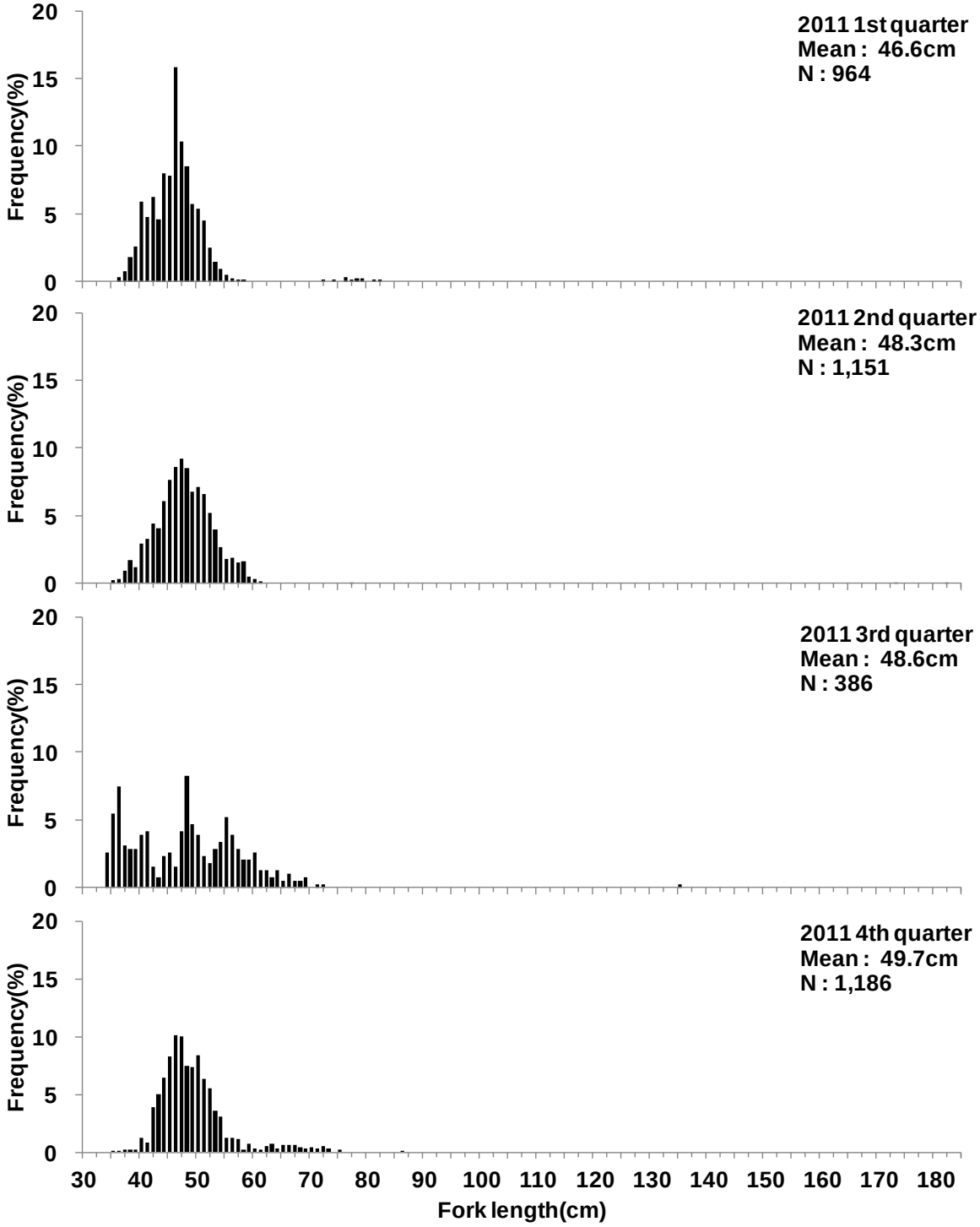

Fig. 8. Quarterly length frequency of PBF caught by offshore large purse seine fishery in 2011

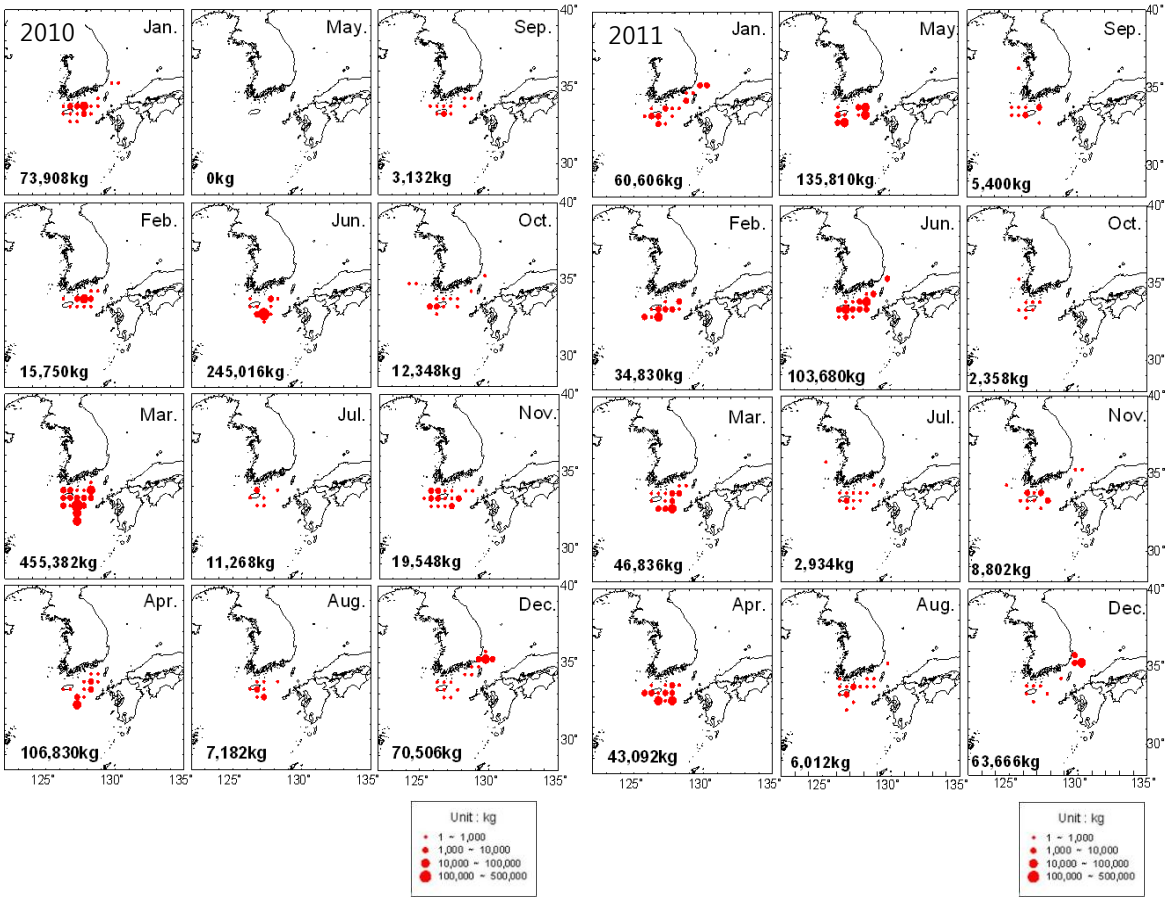

Fig. 9. Monthly distributions of PBT catch by offthore large purse seine fishery in Korean waters from 2010 to 2011.

Table 5. Catch of bluefin tuna by coastal trollers in adjacent sea of Kyeong-nam Province (East of South Sea), Korea in 2011

Year	Month	Date	Catch (inds.)	Average Length (FL, cm)	Average weight (TW, g)
2011	8	29	5	30	450
	8	30	10	30	450
	8	31	22	30	450
	9	1	4	40	900
	9	6	21	25	250
	9	8	6	25	250
	9	9	12	35	750
	9	16	14	40	1250
	9	23	11	25	275
	9	24	19	40	1850
	9	30	7	25	275
	10	3	3	25	275
Total			134	31	705