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National Report of 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). Offshore large purse seiners 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 areas of those RFMO's competence, in the recent years exclusively south of 20°N. DWLL and DWPS are managed by the Distant Water Fisheries Development Act and fisheries related to the mortality of pacific bluefin tuna in the EEZ by the Ministerial Directive put in place in 26 May 2011.

Total catches of Korean distant water tuna and tuna like species in the North Pacific was 56,692 t in 2013. Longline catch was 11,306 t in 2013, which was 57.0 % of the record in 2004. Purse seine catch was 45,386 t in 2013. This was also 45.1% of the peak in 2003. In longline catch, bigeye, yellowfin, swordfish and blue marlin accounted for 53.4%, 17.6%, 9.5%, 8.5% of total, respectively. In purse seine catch, skipjack, yellowfin and bigeye tuna were 89.9%, 9.6 % and 0.5% in 2013, respectively. Longline fishing efforts decreased from 42,485 thousand hooks in 2003 to 34,102 thousand hooks in 2013. Purse seine fishing efforts also decreased from 2,876 sets in 2003 to 1,644 sets in 2013. Purse seine fishing efforts that mostly inclined to the central areas in 2012, moved to the western areas in 2013, while longline efforts were deployed relatively higher in the eastern areas. Pacific bluefin tuna catch by offshore large purse seiners in the EEZ was 604 t in 2013, the lowest since 2000. The catches were distributed in the South Sea centering round Jeju Island throughout the year with the highest in May to July but less than 10 t in August to November, which is the same pattern as in the last 5 years but not the case for 2013 as high catch finished in June.

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 27 as of the end of 2013. 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 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 had been rarely available until 2009 when the WCPFC adopted the CMM 2009-07 that was replaced by the CMM 2010-04 and again by the CMM 2012-06 and CMM 2013-09. Accordingly, Korea established the Ministerial Directive effective in 26 May 2011, in accordance with which research and management have been continuing in Korean EEZ. To strengthen management of Pacific bluefin tuna in Korea, the Ministerial Directive are revising. Catch limitation of juvenile Pacific bluefin tuna will be specified and improvement of catch reporting by fisherman will included in the revised Ministerial Directive.

Since 2010, the National Fisheries Research and Development Institute (NFRDI) has been undertaking a ‘Five-year Scientific Research Plan on PBF’, which is scheduled to be concluded until 2014. Under the plan, the NFRDI is collecting and analyzing the biological data (e.g. length, weight, other biological aspects); and updating and correcting historical and current data.

This report provides the information on the Korean distant-water tuna fisheries in the North Pacific Ocean and Pacific bluefin 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 contains catch and effort and the length measurement to the 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 and the catch statistics for distant water fisheries.

The catch data of Pacific bluefin tuna for 1982-1999 were Japanese import records, for 2000-2004 were the Korean export data to Japanese markets obtained from Korean offshore large purse seine fisheries cooperatives, and for 2005 to 2013, the monthly sale slips of Busan Cooperative Fish Market compiled by the NFRDI. In addition, the data for 2005-2013 were revised on the basis of Yoo et al. (2011) and the data for 2000-2004 were done 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 27 in 2013, the lowest in the last 10 years. 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 125 in 2012 and 125 in 2013. Most 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 118,039 t in 2003 to 38,676 t in 2010, but total catch increased as 104,179 t in 2012, then decreased as 56,692 t in 2013. The catch portion of the North Pacific to the entire Pacific was 32.3% in longline fishery and 19.7% in purse seine fishery in 2013. The catches occurred in the areas south of 20°N. Longline catch was 11,306 t in 2013, which was 57.0 % decrease from the peak in 2004. Purse seine catch was 45,386 t in 2013. This was 45.1% decline from the peak in 2003. In longline catch, bigeye, yellowfin, swordfish, blue marlin, albacore, striped marlin and black marlin were 53.4%, 17.6%, 9.5%, 8.5%, 1.5%, 0.6% and 0.4% in 2013, respectively. Bigeye decreased from 11,000 t in 2012 to 6,000 t in 2013 dramatically, yellowfin and black marlin slightly declined, swordfish slightly increased. In purse seine catch, skipjack, yellowfin and bigeye tuna were 89.9%, 9.6 % and 0.5% in 2013, respectively. Skipjack catch in 2013 was 46.0% of the peak in 2003 and yellowfin tuna catch in 2013 was 15.2% of the peak in 1993. Longline fishing efforts decreased from 42,485 thousand hooks in 2003 to 34,102 thousand hooks in 2013. Purse seine fishing efforts decreased from 2,876 sets in 2003 to 1,644 sets in 2013.

3. Fishing pattern

Catch and effort by gear are mapped in Fig. 4 and 5. Korean tuna longline fishing efforts were higher in the eastern area than those of other years (Fig. 4). While purse seine fishing efforts were concentrated on the western areas in 2013 than those of other years (Fig. 5). 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 central part in 2012, but moved to the western part in 2013. While longline efforts were deployed relatively higher in the eastern areas.

Information on Pacific bluefin tuna catch by coastal fisheries in Korean EEZ

1. Offshore large purse seine fishery

The annual and monthly catches of Pacific bluefin tuna are presented in Table 4 and Fig. 6 and 7. The number of offshore large purse seiners was 24 in 2013, continuously decreasing from 48 in 1994 by virtue of the fishing capacity control by the government. The catch decreased from 1,421 t in 2012 to 604 t in 2013, which was 62.6% of the average catch (965 t) of the last 5 years (2009-2013). The catch occurred throughout year with the highest from May to July but less than 10 t from August to November in the last 5 years. Monthly peak of catch is slightly different annually.

Quarterly distributions of fork length of PBF were presented in Fig. 8. They were almost juvenile (<150 cm). While, in quarter 1, 3 and 4, there was one mode with the range of 40-60 cm, quarter 2 has a different shape with the range of 45-90 cm and 2 modes.

The catch distribution is shown in Fig. 9. The catches were distributed in the South Sea centering round Jeju Island throughout the year. Catches were mostly distributed until July in 2012, while catches were mostly distributed until June in 2013.

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. 61 coastal trollers (1.6-9.2 G/T) targeting Spanish mackerels and yellowtails were approved for fishing Pacific bluefin tuna around Jeju Island in 2012. Among them, 12 coastal trollers (3.6-7.3 G/T) caught Pacific bluefin tuna in 2013. The catches were presented in Table 4 and 5, indicating that a total of 42 kg (53 individuals with 0.8 kg) were in 2013, which were all transferred to the fattening farms.

3. Research activities

On request of WCPFC/NC8, the NFRDI conducted the research on operational characteristics of Korean offshore large purse seiners fishing for Pacific bluefin tuna, with an international scientific observer onboard a vessel (129 G/T) for March-July, 2013. The

observer collected the relevant fishing information such as setting and hauling time, catch by species, feasibility of species identification from sonar monitor, etc. Observer will collect these data for July-December, 2014.

The NFRDI is carrying 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.

The NFRDI will conduct larval survey in the South Sea, 2014. In 2013, a total of 24 juvenile specimens (5.45-7.26mm) of *Thunnus tonggol* were collected from the southeast sea of Jeju Island in July, 2013 (Fig. 10).

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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, 2008-2013

Year	GRT class by gear									
	Longline					Purse seine				
	Total	0-50	51-200	201-500	500+	Total	0-500	501-1000	1001-1500	1500+
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
2012	126	-	-	126	-	28	-	12	11	5
2013	125		1	124		27		12	10	5

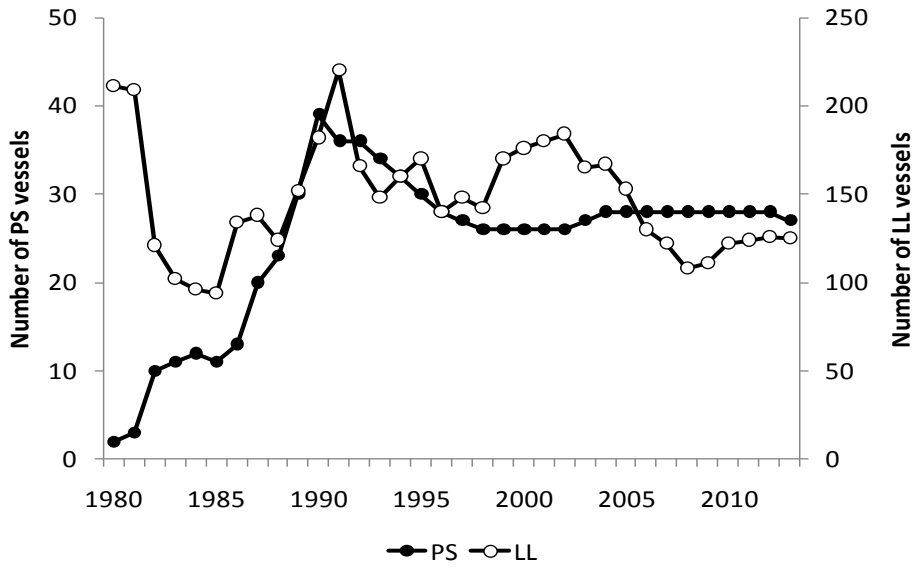

Fig. 1. The annual number of fishing vessels of the Korean tuna distant-water fishery in the Pacific Ocean, 1980-2013.

Table 2. Number of hooks (1,000 hooks) and catch (t) of tuna and tuna-like species by the Korean distant-water longline fishery in the North Pacific during 2002-2013. Data for 2013 is provisional

Year	No. of hooks (1,000)	Catch (mt)											Total
		ALB	YFT	BET	SKJ	BUM	MLS	SWO	BLM	SFA	SHK	OTH	
2002	33,507	112	3,137	10,786	0	152	188	439	479	123	185	1,400	17,001
2003	42,485	146	4,741	9,739	6	159	206	381	819	129	95	931	17,352
2004	38,240	78	5,144	12,453	101	227	75	410	919	1	8	404	19,819
2005	28,687	420	2,958	9,257	35	304	136	404	997	0	10	820	15,340
2006	37,741	135	5,096	11,494	0	217	56	465	1,063	0	0	941	19,468
2007	27,136	137	2,175	9,606	0	121	47	453	887	0	1	291	13,718
2008	36,099	400	2,730	11,075	0	220	30	795	748	0	4	741	16,742
2009	30,855	95	2,992	10,979	0	224	23	994	654	0	13	878	16,852
2010	29,358	107	2,011	9,303	0	257	18	663	570	0	69	532	13,531
2011	35,021	78	3,146	9,047	0	684	48	962	159	1	546	941	15,614
2012	41,996	157	2,398	11,385	8	587	34	856	57	1	499	876	16,859
2013	34,102	173	1,988	6,041	22	963	65	1,071	41	2	735	204	11,306

ALB : Albacore tuna, YFT : Yellowfin tuna, BET : Bigeye tuna, SKJ : Skipjack tuna, BUM : Blue marlin, MLS : Striped marlin, SWO : Swordfish, BLM : Black marlin, SHK : Sharks, OTH : Others

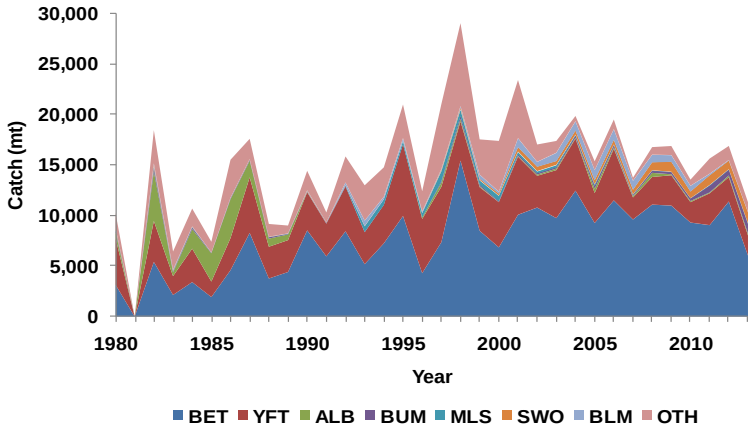

Fig. 2. Annual catch of Korean distant-water longline fishery by primary species in the North Pacific for 1980-2013.

Table 3. Fishing effort (sets) and catch (t) of tunas by the Korean distant-water purse seine fishery in the North Pacific during 2002-2013. Data for 2013 is provisional

Year	No. of sets	Catch (mt)				Total
		SKJ	BET	YFT	OTH	
2002	2,537	64,897	0	16,389	0	81,286
2003	2,876	88,654	319	11,714	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	543	18,270	0	3,585	0	21,855
2008	490	9,233	4	7,842	0	17,079
2009	1,237	38,436	15	7,232	0	45,683
2010	727	20,751	374	4,020	0	25,145
2011	770	18,331	216	5,256	0	23,803
2012	2,402	67,448	404	19,467	1	87,320
2013	1,644	40,809	232	4,344	0	45,386

SKJ : Skipjack tuna, BET : Bigeye tuna, YFT : Yellowfin tuna, OTH : Others

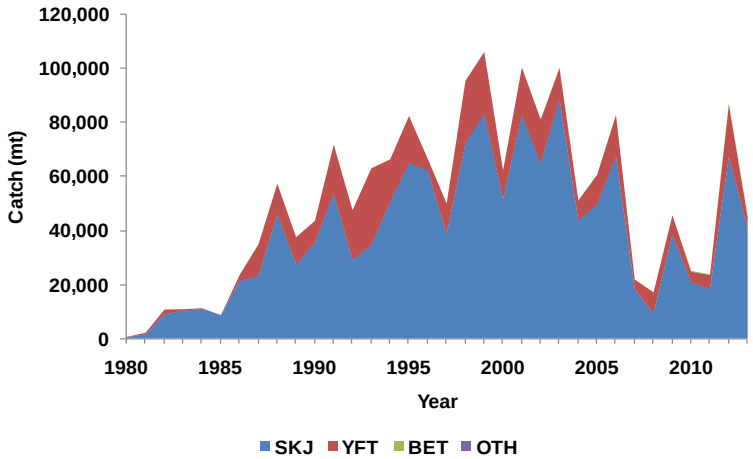

Fig. 3. Annual catch of Korean distant-water purse seine fishery by primary species in the North Pacific during 1980-2013.

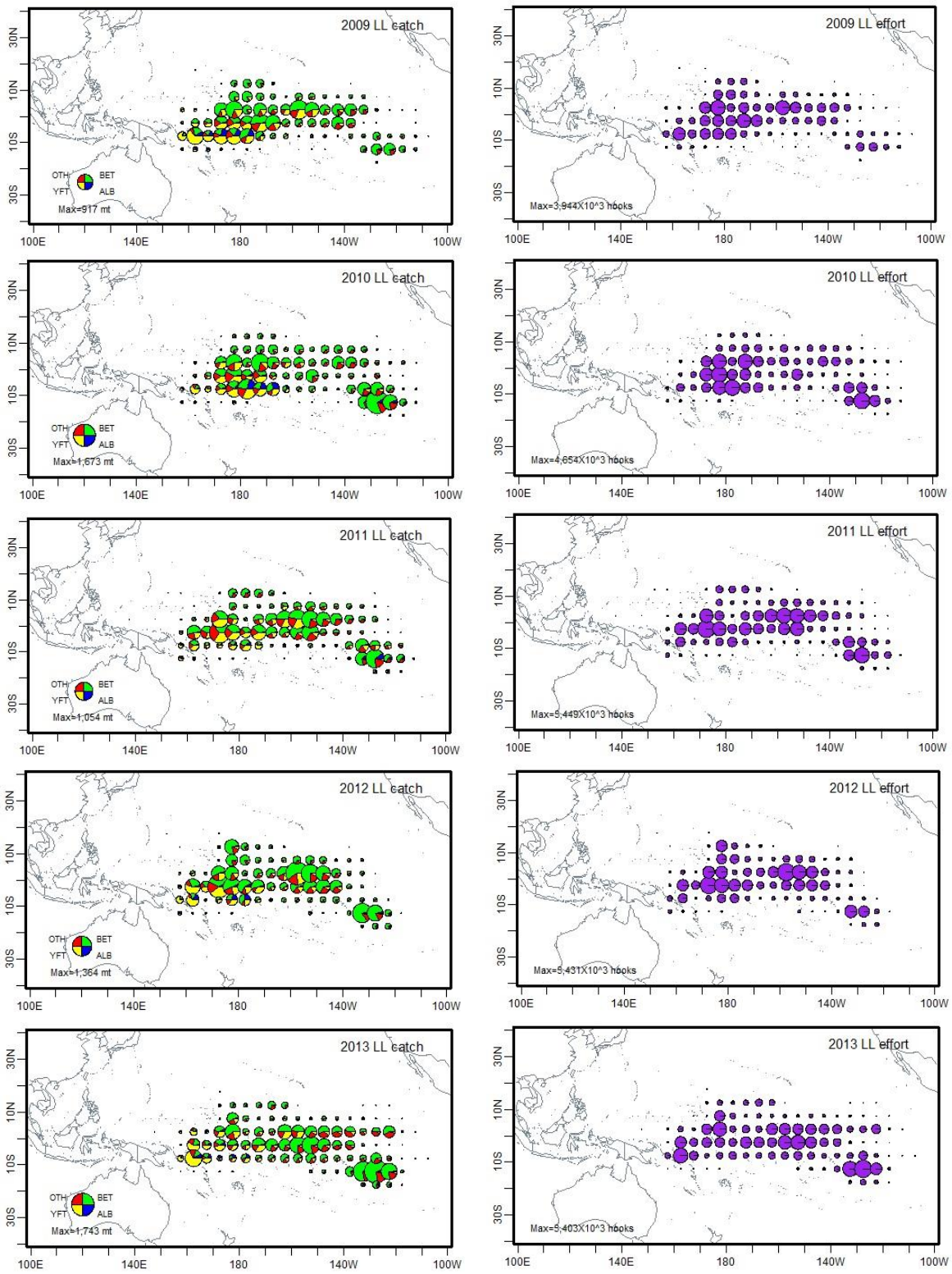

Fig. 4. Annual catch and effort distributions of target species by Korean distant-water longline fishery operating in the Pacific Ocean, 2009-2013.

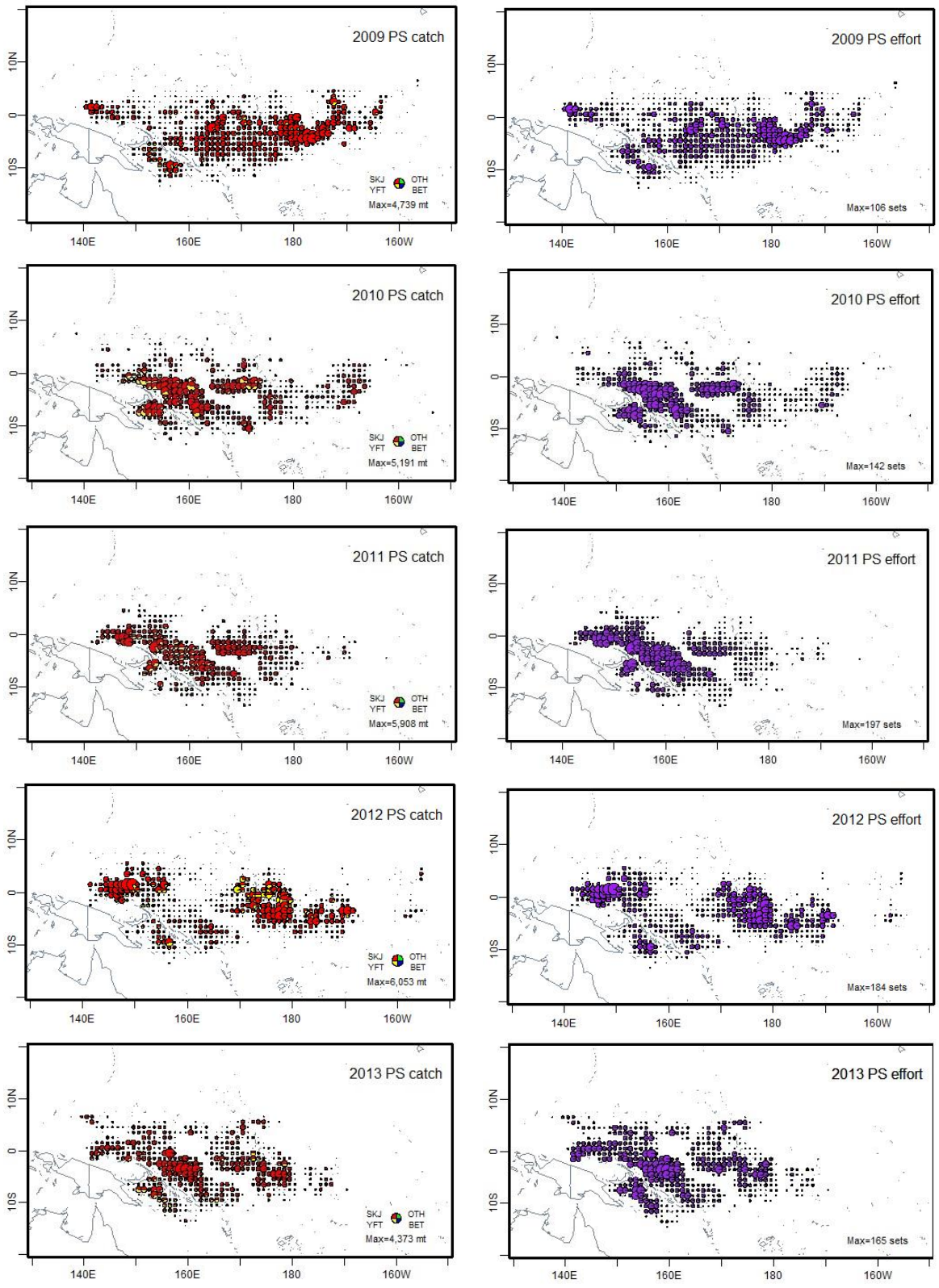

Fig. 5. Annual catch and effort distributions of target species by Korean distant-water purse seine fleets operating in the Pacific Ocean, 2009-2013.

Table 4. Annual catch of Pacific bluefin tuna by offshore large purse seiners and coastal trollers in Korean waters

Year	PBF catch by OLPS*[1] (t)	Number of OLPS vessesls	PBF catch by coastal trollers (t)	Number of active coastal trollers
1982	31	48		
1983	13	48		
1984	4	48		
1985	1	48		
1986	344	48		
1987	89	48		
1988	32	48		
1989	71	48		
1990	132	48		
1991	265	48		
1992	288	48		
1993	40	48		
1994	50	48		
1995	821	36		
1996	102	36		
1997	1054	36		
1998	188	36		
1999	256	36		
2000	2401	32		
2001	1176	32		
2002	932	32		
2003	2601	29		
2004	773	29		
2005	1318	29		
2006	1012	29		
2007	1281	29		
2008	1866	29		
2009	936	27		
2010	1196	25		
2011	670	25	0.1	14
2012	1421	24	1	34
2013*[2]	604	24	0.0	12

*1 : OLPS is Offshore Large Purse Seiner

*2 : Data for 2013 is provisional

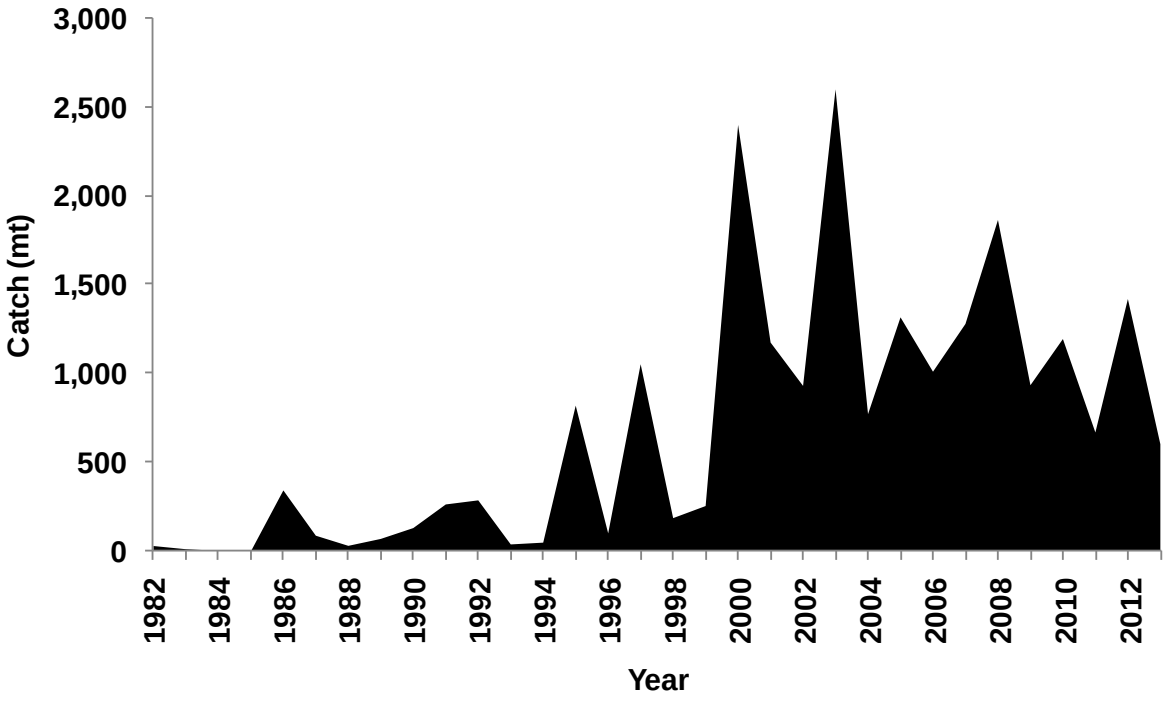

Fig. 6. Annual catch of Pacific bluefin tuna caught by offshore large purse seiners from 1982 to 2012.

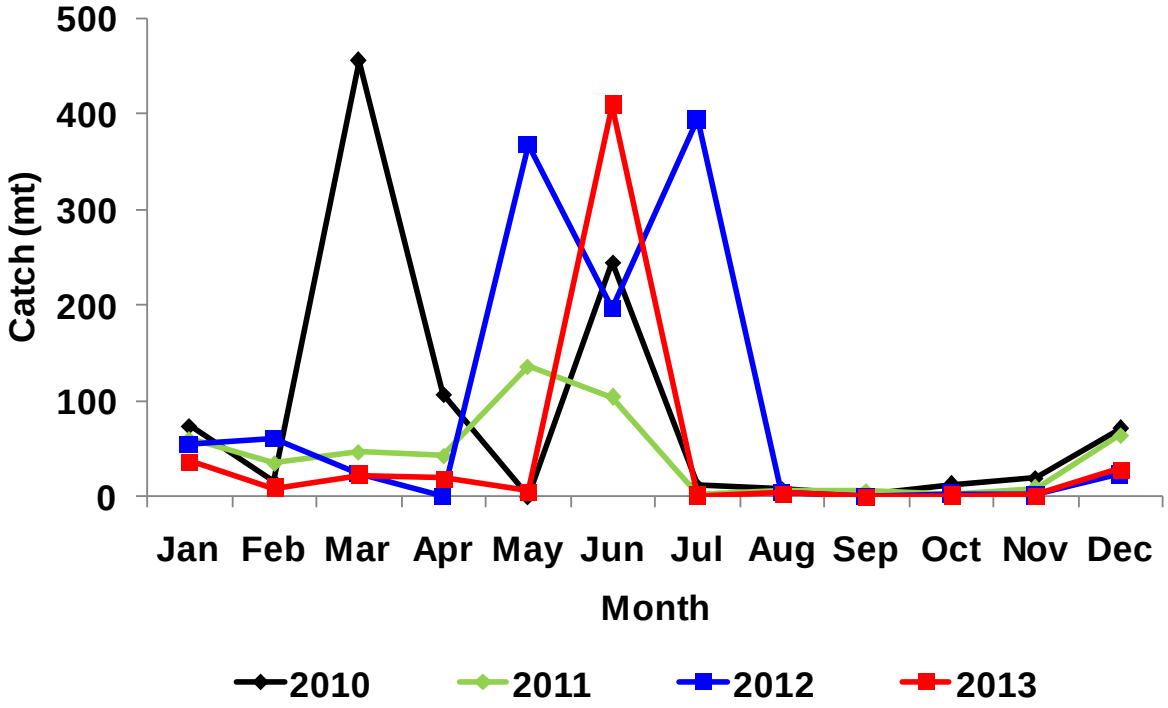

Fig. 7. Monthly catches of Pacific bluefin tuna caught by offshore large purse seiners from 2010 to 2013.

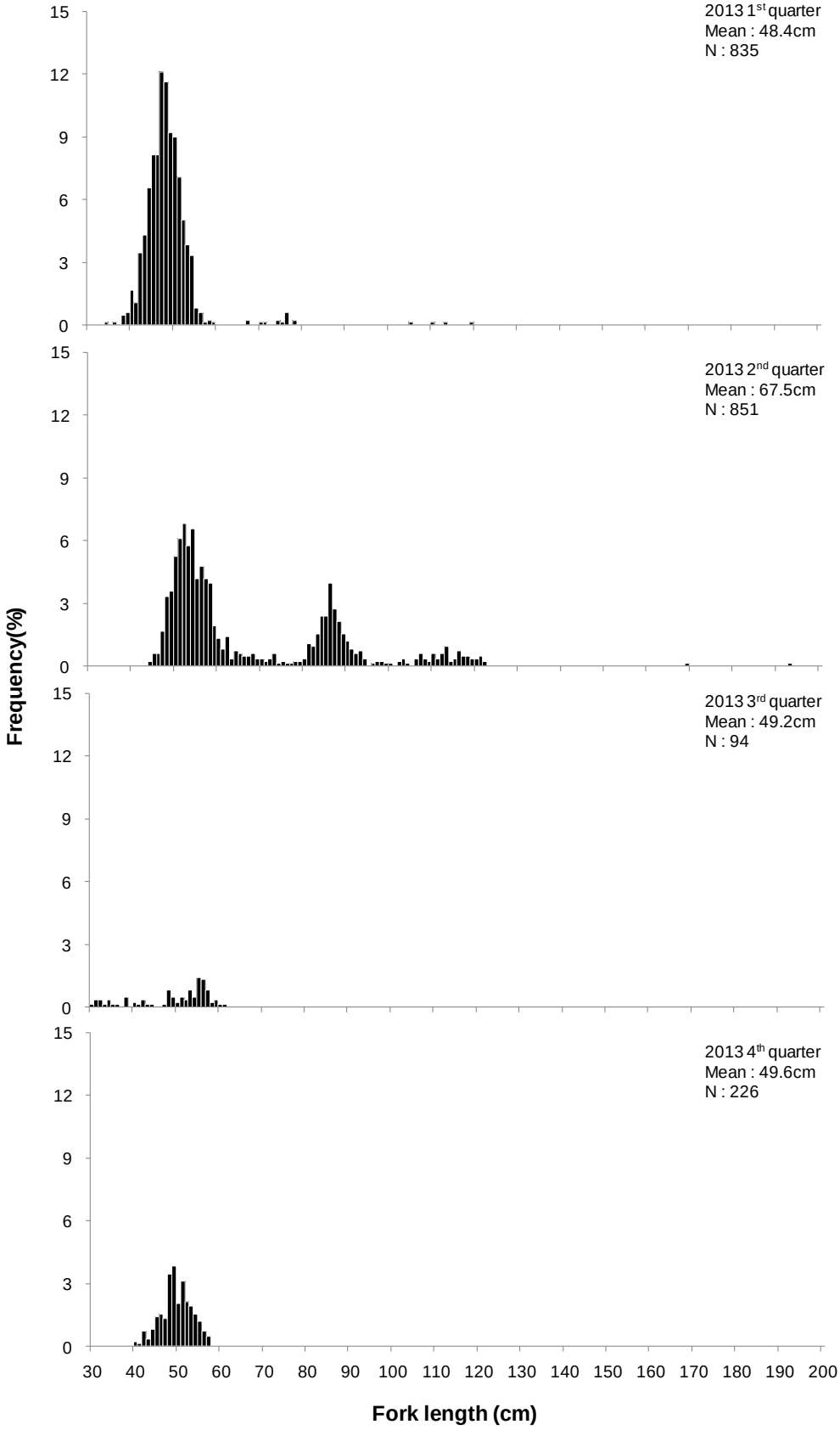

Fig. 8. Quarterly length frequency of Pacific bluefin tuna caught by offshore larger purse seiners in 2013.

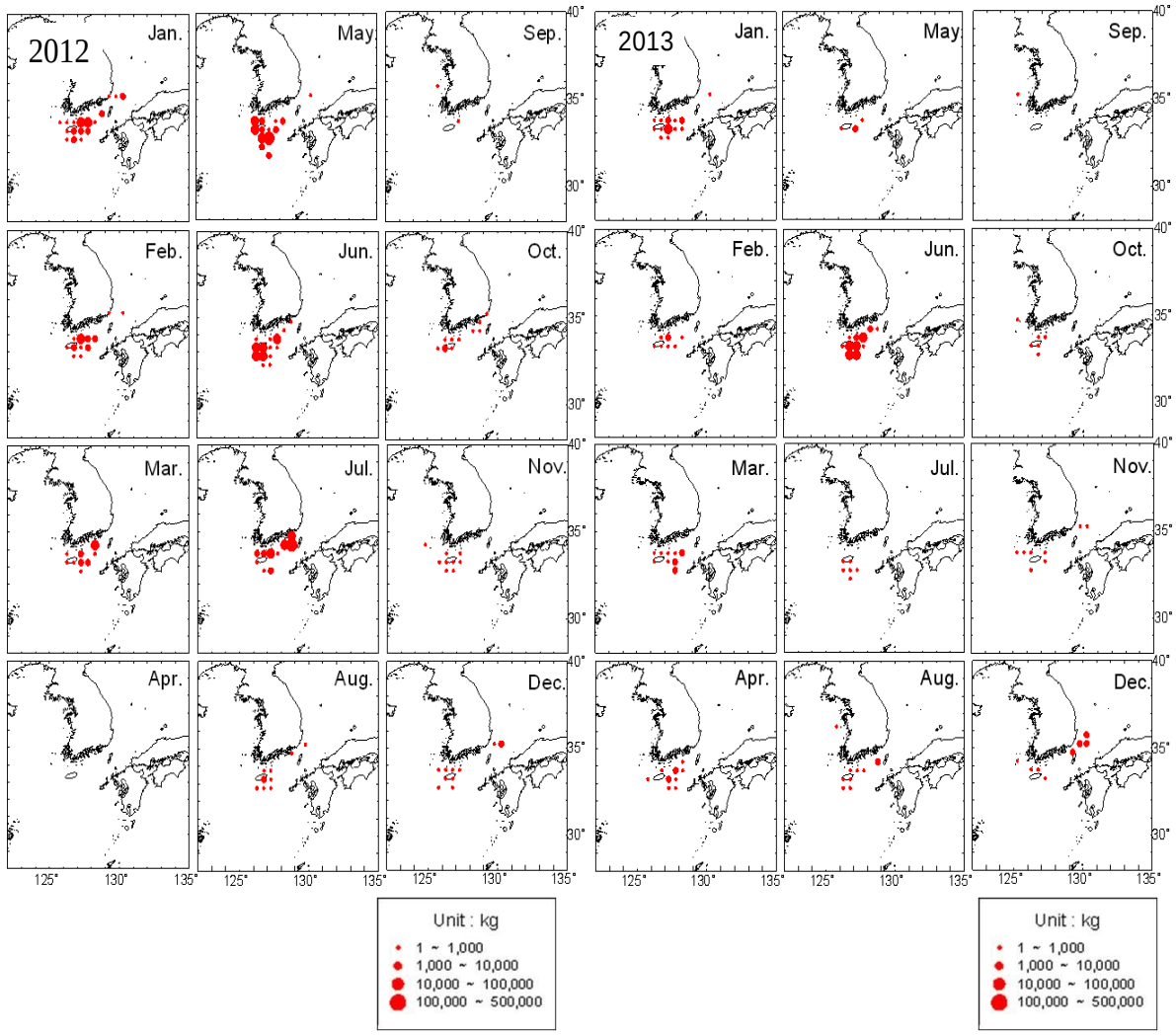

Fig. 9. Monthly distributions of Pacific bluefin tuna caught by offshore large purse seiners in Korean waters from 2012 to 2013.

Table 5. Catch of Pacific bluefin tuna by coastal trollers in adjacent water of Chuja Island (Northwestern South Sea) in 2013

Year	Month	Day	Catch (inds.)	Average weight (TW, g)
2013	9	5	3	800
		7	12	
		8	29	
		9	9	
Total		53		42,400

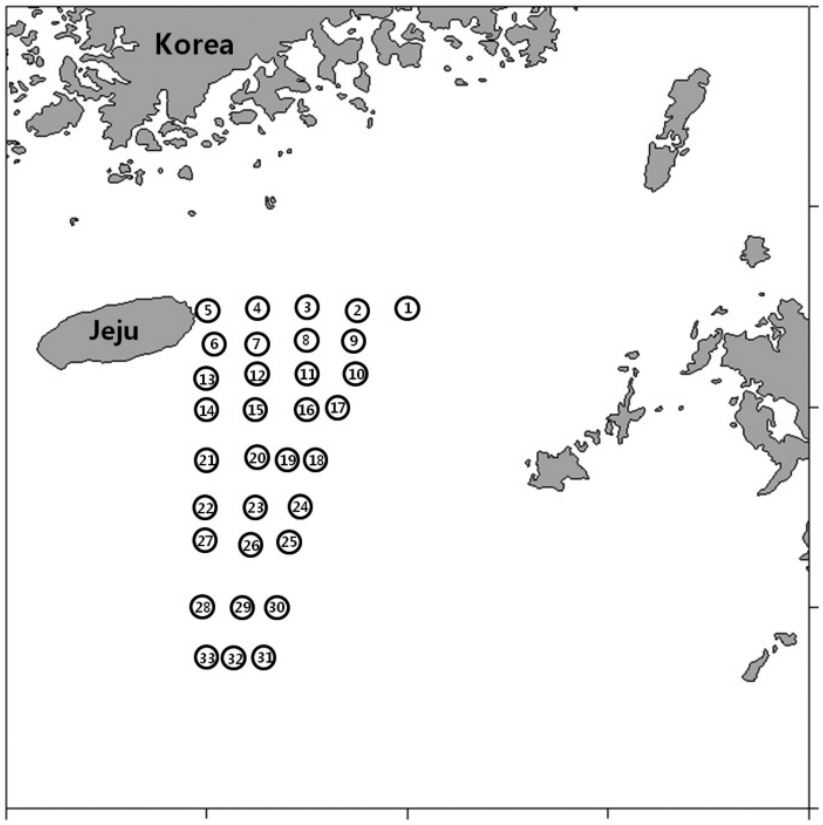

Fig. 10. Map showing the PBF larval survey area.