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National Report of the Republic of Korea¹

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Two Korean fisheries, distant-water tuna longline and purse seine, engage in fishing tuna and tuna-like species in the North Pacific Ocean. In the Pacific Ocean, the numbers of longline fishing vessels were 184 in 2002, 122 in 2007, 108 in 2008, 111 in 2009 and 122 in 2010, while those of purse seine fishing vessels were 39 in 1990, 28 in 2007, 28 in 2008, 27 in 2009 and 29 in 2010. The main target species in the longliners were bigeye and yellowfin tunas, and those in the purse seiners were skipjack and yellowfin tunas. The annual catches of bigeye tuna in the longliner increased since 1980s, which ranged between 5,411 tons in 1982 and 15,425 in 1998. While the catch of yellowfin tuna in the longliner was steadily around 4,000 tons since the mid 1970s, that of yellowfin tuna gradually decreased after a peak in 1995 at 7,107 tons. The average catch of albacore during the recent 5 years was 169 tons and that of billfishes in 2000s was 1,633 tons in the longliners. The annual catches of skipjack tuna in the purse seiners have steadily increased to reach the peak at 88,654 tons in 2003, and then sharply decreased with a large fluctuation in recent years. The yellowfin tuna catches in the purse seiners showed a steady increase until 1993, but thereafter a decreasing trend. The main fishing ground of the longliners was formed between 20°N and 20°S and in the west Pacific of 150°W, and the purse seiners were operated in the tropical area of the Western and Central Pacific between 10°S-10°N in latitude and between 140°E-160°W in longitude. The annual catch of PBF by the Korean domestic purse seiners after 1994 tended to increase with large annual fluctuation and peaked at 2,141 tons in 2003 (Table 1). On the contrary, the fleet number of the offshore purse seiners has been gradually decreased to 25 in 201. The fishing ground of PBF in 2009 and 2010 was mainly formed around Jeju Island in spring. The catch level of PBF by set net could be quite low.

Introduction

Korean tuna fisheries began with small experimental longline fishing for tunas in the mid 1950s in the Indian Ocean. In recent years, tuna fisheries production in the Pacific Ocean occupied about at 97 % of the total production of Korean distant-water tuna fisheries. Two Korean fisheries, distant-water tuna longline and purse seine, engage in fishing tuna and tuna-like species in the North Pacific Ocean.

In 2010, National Fisheries Research & Development Institute (NFRDI) trained 6

international scientific observers and dispatched them 18 times for data collection onboard distant-water fishing vessels.

This report aimed to provide data and information from the Korean distant-water tuna fisheries. Moreover, this report described temporal and spatial variations in the catch of Pacific bluefin tuna in Korea waters in order to provide information on the catch of Pacific bluefin tuna as ISC requested.

Data and Methodology

The official catch data from distant-water tuna fisheries in the Pacific Ocean were originated from the Fishery Production Survey of the Korea Statistical Information Service (KOSIS) and the Statistical Year Book of Overseas Fisheries published by Korea Overseas Fisheries Association (KOFA). A database system (named OFIRIS) of the National Fisheries Research & Development Institute (NFRDI) also compiled the logbook data of Korean tuna longliners and purse seiners, which operated in the Pacific Ocean and submitted to NFRDI. The coverage of catch compilation in the OFIRIS to official catches of longliner and purse seiners were 71.2 % and 95.4 %, respectively.

The catch in the North Pacific was estimated by multiplying the catch ratio of North Pacific sampled by the OFIRIS to the official catch in the entire Pacific Ocean. Conversion factors described in the report of 14th meeting of SCTB were also used to estimate the whole weight from the processed weight in tunas and tuna-like species.

Since there was no catch statistics for Pacific Bluefin tuna (PBF) until 2004 in Korean waters, the PBF catches were estimated from Japanese import records during the period of 1982-1999 and export data during the period of 2000-2004, which were obtained from the Korean domestic purse seine fisheries cooperatives. Since 2005, however, the PBF catch data have been based on monthly sale slips of the purse seiners, obtained from Busan Cooperative Fish Market, and finally compiled into the OFIRIS.

In order to examine the PBF catch by set net fishery in the coastal waters of Korea in 2010, fish composition of 7 set nets in the southern coast of Korea were collected on the daily basis.

Catch of distant-water tuna longliners in the North Pacific

The number of vessels of the distant-water tuna longliners in the North Pacific tended to decrease after 2002 (184 longliners) and their number in 2010 was 122 longliners (Fig. 1). Table 1 shows the number of hooks and annual catches of tuna and tuna-like species by the Korean distant-water longliners since 1972. The number of hooks showed a steady increase until 2003 to a peak of 42.4 million hooks, and then a marked decreased.

In the North Pacific, the catches of tuna and billfishes peaked at 32,138 tons in 1975 and declined steeply to 5,958 tons in 1983. Those of tuna and billfishes then increased after the mid 1980s and again decreased after a second peak in 1998 at 27,970 tons.

The dominant species caught by the longliners were bigeye and yellowfin tunas. The proportion of catch of bigeye and yellowfin tunas to total catch during the last 5 years was 65.7 % and 18.5 %, respectively. The annual catches of bigeye tuna tended to increase since 1980s, and the catches ranged between 5,411 tons in 1982 and 15,425 in 1998. The catches of yellowfin tuna gradually decreased after a peak in 1995 at 7,107 tons, while yellowfin tuna was steadily caught around 4,000 tons since the mid 1970s. The annual catches of albacore showed large annual changes from the mid 1970s to the mid 1980s with a peak in 1975 at 7,051 tons, and then the catches rapidly decreased. The average catch of albacore during the last 5 years was 169 tons. Billfishes were comprised of blue marlin, striped marlin, swordfish, black marlin and sailfish. The annual catches of billfishes tended to increase since the late of 1980s, and its average catch in 2000s was 1,633 tons.

The main fishing ground of the distant-water longliners was formed between 20°N and 20°S (Fig. 2). Further, the proportion of catch of the bigeye and yellowfin tunas in the west Pacific of 150°W to total catch in the entire Pacific ocean was 92.6 % and 63.6 %, respectively.

Catch of distant-water tuna purse seiners in the North Pacific

The number of vessels of purse seiners operated in the Pacific Ocean reached a peak in 1990 (39 purse seiners), and then steadily decreased. The number of vessels in 2010 was 29 purse seiners (Fig. 3).

The fishing effort of purse seine vessels in the North Pacific is about 90% of the actual effort because the catch and effort report from the captain of the vessels is about 90% and consequently this data should be used to refer to the trend of fishing effort. The effort was sharply increased until 1991 with a peak at 6,070 hauls and then henceforth decreased to 492 hauls, where it was 1,247 hauls in 2009 (Table 2).

The total catch of tunas in the north Pacific by purse seine fishery was 46,008 tons in 2009 (Table 2). It ranged from 550 to 106,394 tons with an average of 50,566 tons from 1980 to 2009.

The dominant species of the purse seiners were skipjack and yellowfin tunas. In particular, the catch of skipjack tuna accounted for 78.1 % of total catch of the longline fishery during 1980-2010. The annual catches of skipjack tuna have steadily increased to reach the peak at 88,654 tons in 2003, and then sharply decreased with a large fluctuation in recent years (Table 1). The yellowfin tuna catches showed a steady increase until 1993, but thereafter a decreasing trend (Table 2).

Korean tuna purse seiners were operated in the tropical area of the Western and Central Pacific between 10°S-10°N in latitude and between 140°E-160°W in longitude (Fig 3).

Catch of Pacific bluefin tuna in Korean waters

Most of Pacific bluefin tuna (PBF) in Korean waters has been caught by Korean domestic

purse seiners and exported to Japanese markets. The annual catch of PBF after 1994 tended to increase with large annual fluctuation and peaked at 2,141 tons in 2003 (Table 3). On the contrary, the fleet number of the offshore purse seiners has been gradually decreased by virtue of the fishing capacity control by the government since 1994 (Table 3). The fleet number in 2010 was 25. Gear types during 1982-1999 were unknown, but the major gear was probably purse seine.

The fishing ground of PBF in 2009 and 2010 was mainly formed around Jeju Island in spring (Fig. 5). While an additional fishing ground tended to form around Tsushima Island, monthly changes of the fishing ground was large (Fig. 5)

As a result of our investigation on fish composition from coastal set net fisheries in 2010, PBF was not observed amongst fishes from set nets. This indicates that the catch level of PBF by set net is quite low.

Research activities

In 2010, NFRDI monitored 18 fishing trips with 7 international onboard observers to monitor catch of target and by-catch species in the Korean distant-water fishing vessels. For improvement of catch monitoring, the annual observer coverage onboard distant-water fishing fleets and to landing sites will be continuously increased.

A research project on biological and ecological research of PBF has already started in 2010. We collected more data, such as, number of box used in auction of PBF, actual weight of catch/box of PBF by size, detailed catch data from daily sale slips, etc., in order to archive better information on PBF catch by the domestic purse seiners. Henceforth the various data relative to PBF catch will be usable for improving statistics system on the species. In addition, regarding the status of PBF catch from set net, NFRDI will continuously monitor the fish composition from coastal set net fishery in Korean waters.

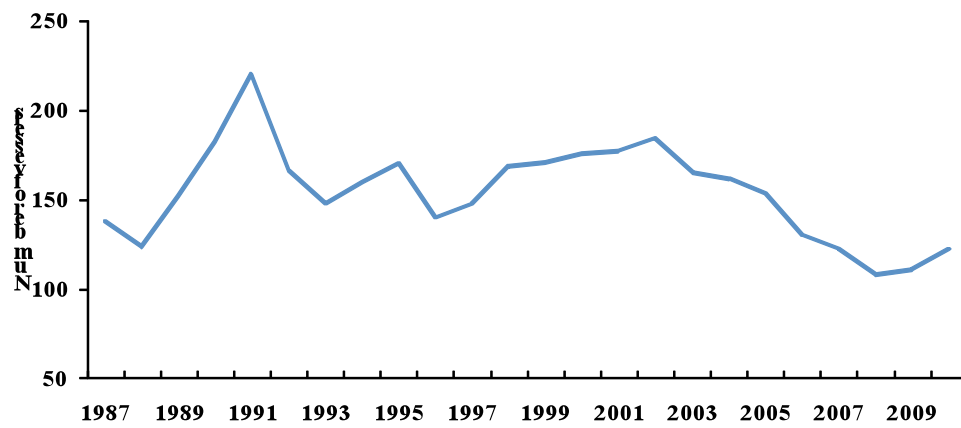


Fig. 1. Annual changes in the number of fishing vessels of the Korean distant-water longline in the Pacific Ocean.

Table 1. Number of hooks (1,000 hooks) and catch (ton) of tuna and tuna-like species by the Korean distant-water longliner in the North Pacific.

YEAR	Hooks	Albacore	Yellowfin tuna	Bigeye tuna	Bluefin tuna	Skipjack	Blue Marlin	Striped Marlin	Sword fish	Black Marlin	Sailfish	Others	Total
1972	3	0	153	91	0	6	0	0	0	0	0	0	250
1973	59	5	3	3	0	5	0	0	0	0	0	8	24
1974	465	91	4,040	3,914	0	242	0	0	0	0	0	683	8,970
1975	2,246	7,051	5,749	9,323	4	2,966	0	0	0	0	0	7,045	32,138
1976	5,882	2,213	5,936	6,494	6	90	0	0	0	0	0	3,145	17,883
1977	7,292	501	6,266	9,634	0	1,394	0	0	0	0	0	2,711	20,506
1978	5,073	670	4,990	3,126	3	2,047	0	0	0	0	0	2,387	13,222
1979	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1980	15,945	592	4,609	3,158	0	54	155	74	135	34	633	242	9,685
1981	31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1982	17,292	4,874	4,046	5,411	0	138	351	102	167	192	1,378	344	17,002
1983	1,450	366	1,862	2,143	0	13	83	49	48	92	1,226	76	5,958
1984	6,816	1,925	3,305	3,417	2	25	155	40	28	51	842	563	10353
1985	9,237	2,789	1,534	1,935	0	3	46	13	12	12	540	393	7,278
1986	7,146	3,833	3,173	4,594	0	1	86	15	19	32	523	3,022	15,299
1987	20,989	1,624	5,484	8,283	13	15	89	15	50	23	99	1,760	17,457
1988	13,917	800	3,139	3,772	0	5	133	17	28	13	0	1,171	9,078
1989	19,086	562	3,149	4,413	0	8	8	33	8	20	1	741	8,943
1990	24,997	30	3,764	8,528	0	4	45	1	46	30	2	1,851	14,301
1991	20,093	5	3,225	5,958	0	5	75	7	37	5	0	874	10,192
1992	22,731	2	4,426	8,437	0	2	60	54	32	242	398	1,924	15,576
1993	19,714	3	3,155	5,187	0	3	36	569	27	514	586	2,629	12,709
1994	19,659	3	3,811	7,247	0	0	2	557	4	225	1,198	1,567	14,614
1995	32,875	14	7,107	9,951	0	0	1	307	10	251	221	2,926	20,786
1996	18,483	158	5,358	4,296	0	1	10	429	15	126	244	1,639	12,276
1997	17,927	404	5,475	7,353	0	0	145	1,017	100	78	1,292	4,472	20,338
1998	30,143	226	3,871	15,425	0	0	335	635	153	146	382	6,796	27,970
1999	27,697	99	4,307	8,490	0	0	165	433	132	408	198	2,499	16,731
2000	16,627	15	4,460	6,851	0	2	96	537	202	186	127	4,016	16,492
2001	32,061	64	5,747	10,071	0	2	166	254	438	895	28	5,203	22,868
2002	33,507	112	3,137	10,786	0	0	152	188	439	479	123	1,400	16,816
2003	42,485	146	4,741	9,739	0	6	159	206	381	819	129	931	17,256
2004	38,240	78	5,145	12,468	0	101	227	75	410	919	1	404	19,827
2005	28,687	420	2,958	9,257	0	35	304	136	404	997	0	823	15,333
2006	37,741	135	5,096	11,494	0	0	217	56	465	1,063	0	941	19,468
2007*	26,809	93	2,175	9,574	0	0	121	46	451	887	0	185	13,532
2008*	32,107	394	2,676	10,858	0	0	215	29	773	709	0	657	16,311
2009*	26,465	102	3,014	10,962	0	0	227	22	989	642	0	960	16,918
2010*	21,862	122	1,979	10,134	0	0	257	18	704	593	0	573	14,379

*Data during 2007-2010 is provisional.

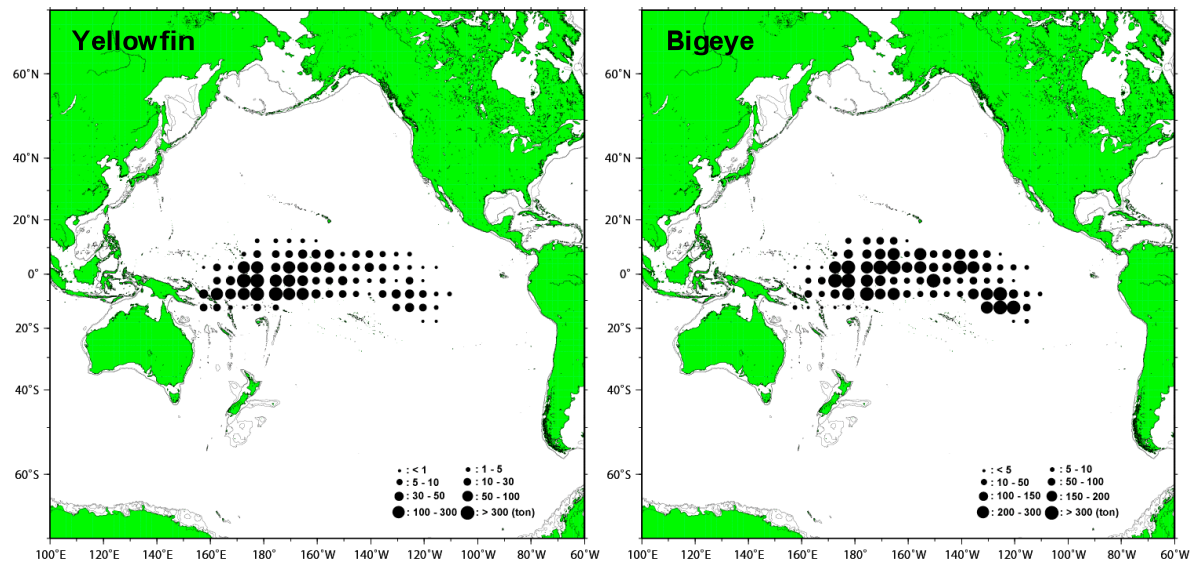


Fig. 2. Horizontal distributions of yellowfin and bigeye tunas caught by the distant-water tuna longliners in the Pacific Ocean in 2010.

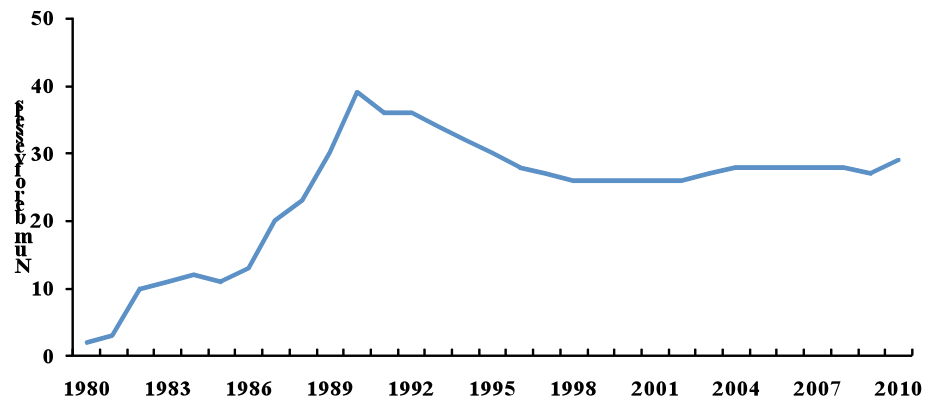


Fig. 3. Annual changes in the number of fishing vessels of Korean distant-water purse seiner in the Pacific Ocean.

Table 2. Fishing effort (hauls) and catch (ton) of tunas by the Korean distant-water purse seine in the North Pacific.

YEAR	Hauls	Skipjack tuna	Bigeye tuna	Yellowfin tuna	Others	Total
1980	30	476	0	74	0	550
1981	127	1,462	0	635	0	2,097
1982	400	8,838	0	1,854	0	10,692
1983	375	10,314	0	519	0	10,833
1984	626	10,893	0	285	0	11,179
1985	604	8,590	0	0	0	8,590
1986	805	21,334	0	2,264	0	23,597
1987	1,220	23,119	190	11,818	0	35,127
1988	1,403	46,139	0	11,265	0	57,404
1989	1,772	27,372	139	10,184	0	37,695
1990	2,596	35,609	33	8,037	0	43,679
1991	6,070	53,585	3	18,344	0	71,932
1992	4,502	29,057	3	18,569	0	47,628
1993	4,508	34,594	0	28,570	0	63,164
1994	4,746	50,603	0	15,887	5	66,494
1995	4,461	65,069	0	17,503	0	82,572
1996	4,986	62,361	0	4,263	0	66,624
1997	3,395	38,696	0	11,370	0	50,066
1998	2,699	72,433	106	23,193	0	95,732
1999	1,687	83,292	0	23,102	0	106,394
2000	750	51,603	0	10,773	0	62,376
2001	3,259	82,889	0	17,719	0	100,608
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*	1,247	38,644	15	7,201	0	46,008
2010*	732	57,490	54	15,193	0	72,737

*Data during 2009-2010 is provisional

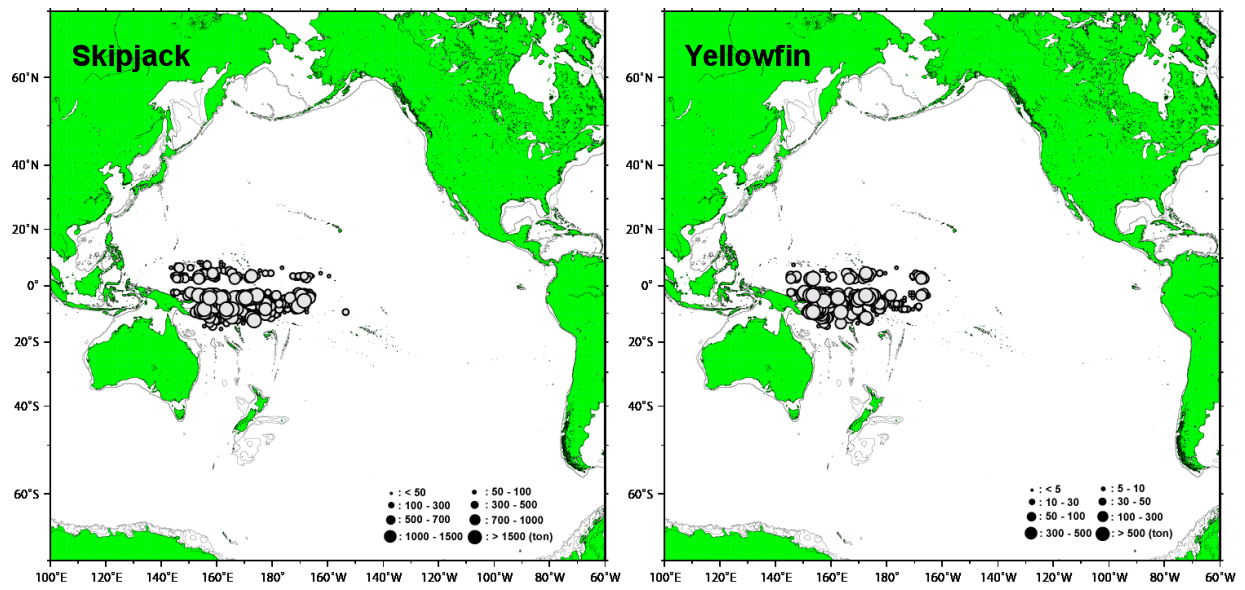


Fig. 4. Horizontal distributions of skipjack and yellowfin tunas caught by the distant-water tuna purse seiners in the Pacific Ocean in 2010.

Table 3. Annual catch of PBF by offshore purse seiners in Korea (unit: in tons)

Year	Gear type	Permitted number of fleets	Current catch	Revised catch	Data source
1982	(ps)*	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		**Export data to Japan
2000	ps	32	1,976		
2001	ps	32	968		
2002	ps	32	767		
2003	ps	29	2,141		
2004	ps	29	636		Sale slips at Busan Cooperative Fish Market
2005	ps	29	1,085	1,318	
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	

*(ps) means that gear was unknown during 1982-1999, but probably purse seine.

**Export data of PBF to Japan obtained from the Korean domestic purse seine fisheries cooperatives.

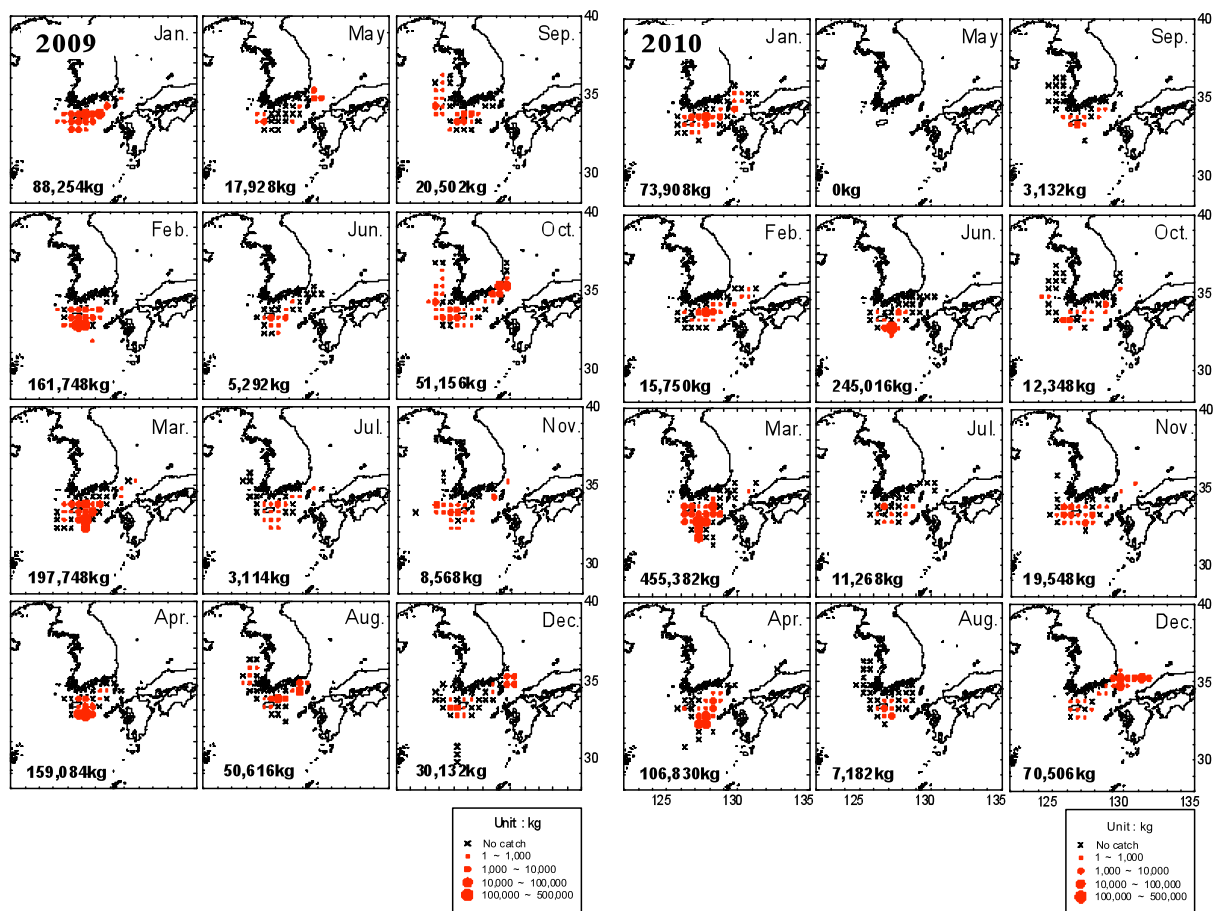


Fig. 5. Monthly horizontal distributions of PBF caught by offshore purse seiners in Korean waters from 2009 to 2010.