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By-catch of Pacific Bluefin Tuna in the Waters off Korea¹

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Introduction

Pacific bluefin tuna (PBF) are mainly fished by purse seine as by-catch species in the coastal waters of Korea. As PBF are incidentally caught by Korean domestic purse seine fishery targeting mackerels and jack mackerels and its catch are changed by monthly, PBF was not paid much attention by Korean domestic fisheries. The PBF caught in Korean waters mainly consists of small size less than one meter of fork length, most of which are exported to Japanese market for sashimi and some minor quantity are consumed domestically.

Korean government started fisheries observer programs for both domestic and international water fisheries including tuna fisheries from year of 1998. Although, the international observer program is small and 5 observers activated in 2005 for oversea area, but will be gradually expanded to cover all necessary areas of fisheries. The National Fisheries Research and Development Institute (NFRDI) has taken efforts to collect the PBF data by the Korean fisheries and is reconstructing database system.

Status of Korean Fisheries for PBF

Catch

During the year 2000 and 2005, average catch of the PBF from 33 purse seiners and 4 trawlers amounted to 900 mt but the catch varies between 594 and 1,591mt (Table. 1). The decreased 2005 catch compared with 2004 catch was mainly due to the decrease in purse seine catch.

Table 1. Korean Pacific blue fin tuna catch by fisheries.

Year	Vessel active			Catch (mt)		
	Purse seine	Trawl	Total	Purse seine	Trawl	Total
2001	33	4	37	995	10	1,005
2002	33	4	37	674	1	675
2003	33	4	37	1,591	0	1,591
2004	33	4	37	636	0	636
2005	33	4	37	594	0	594

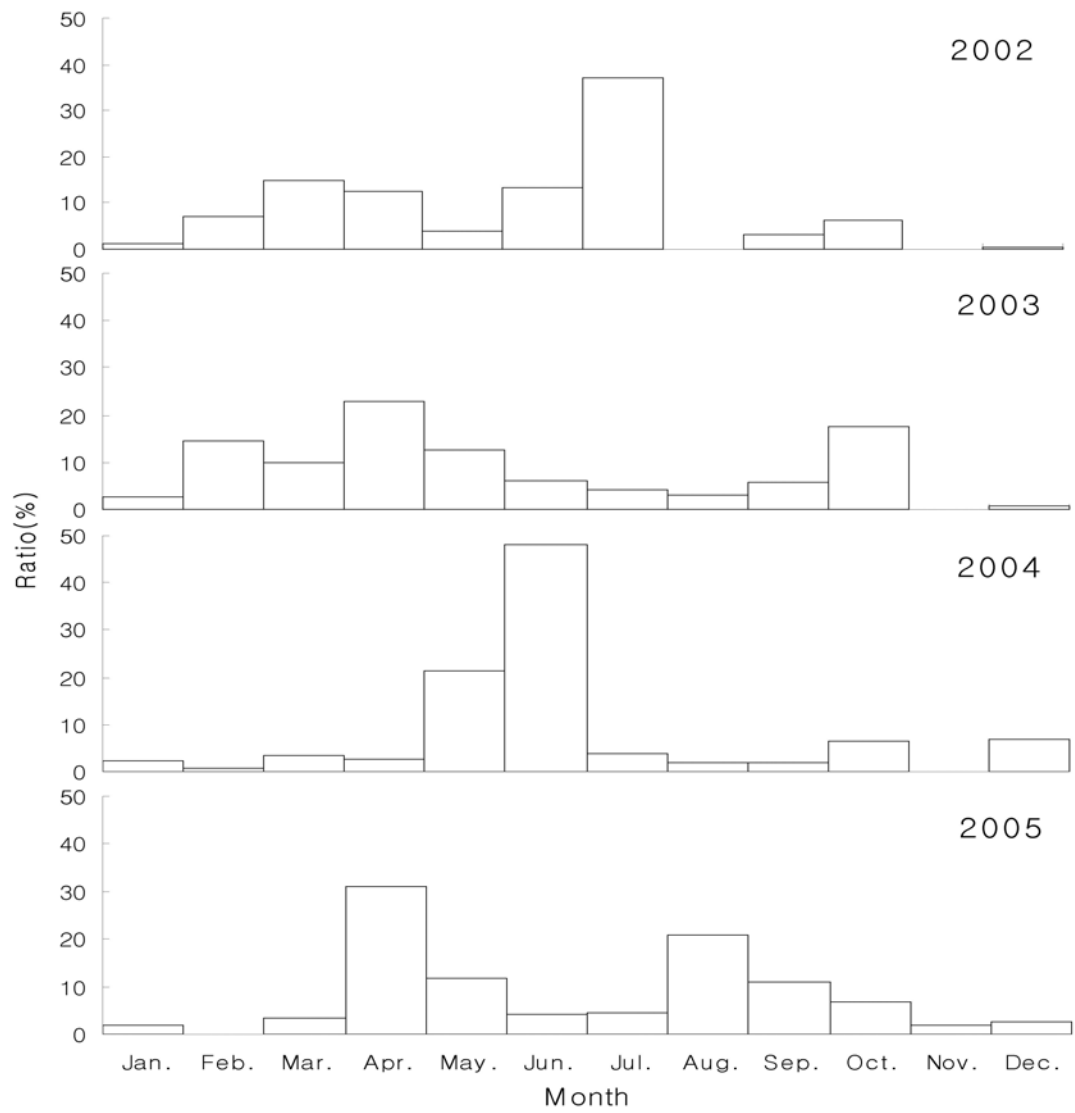


Fig. 1. Monthly catch proportion of Pacific bluefin tuna by the Korean offshore purse seine fishery from 2002 to 2005

Pacific bluefin tuna catch is conducted when the temperature of offshore rises and mackerel, jack mackerel and squid are moving to northward for southern area of Korea and precisely Pacific bluefin tuna is caught from February to September by purse seine.

Monthly catch proportion shows that the highest catch was taken in April and August in the year 2005 but in June and July in 2002 and 2004 (Fig. 1), and only minor catches were reported during winter months from November to January in both years. The main catch began in April 2005, as the temperature of offshore rose earlier than that of the previous year. But annual catch variation by monthly was very irregularity and it comes from water temperature changes in the offshore area of Korea.

Total longline tuna production in the Pacific during the last 10 years has been fluctuating between 37,000 to 60,000 mt, averaging 48,000 mt. Catches in the North Pacific Ocean

ranged from 11,000 to 27,000 mt, averaging 18,000 mt during that period. Table 2 shows longline tuna catches by species in the North Pacific Ocean.

Major species in the North Pacific Ocean longline catches are bigeye and yellowfin, which comprised 74% of the total catch in this area. In 2005 bigeye and yellowfin catches decreased by 18% and 20%, while albacore and billfishes catches increased, respectively compared with those in the previous year.

Table 2. Estimated catches of Korean longliner in the North Pacific area by species

Species Year	Albacore	Yellowfin tuna	Bigeye tuna	Bluefin tuna	Blue Marlin	Striped Marlin	Swordfish	White Marlin	Sailfish	Skipjack	Others	Total
1996	158	4,913	3,903	0	8	348	12	0	244	0	1,817	11,403
1997	404	5,031	6,661	0	114	828	246	2	1,292	0	4,830	19,410
1998	218	3,544	13,991	0	265	519	123	11	382	0	8,159	27,212
1999	99	3,946	7,598	6	131	352	104	5	198	0	3,555	15,994
2000	15	4,091	6,212	19	76	436	161	1	127	2	5,282	16,423
2001	64	5,275	9,141	2	132	206	349	25	28	2	6,434	21,657
2002	113	2,893	9,814	0	121	153	350	1	123	0	1,815	15,383
2003	144	4,219	8,861	0	125	172	311	13	129	6	1,098	15,079
2004	68	4,654	12,605	0	175	75	350	3	1	109	885	18,925
2005	520	2,990	10,392	0	259	115	407	394	0	33	1,323	13,905

* 2005 data is preliminary

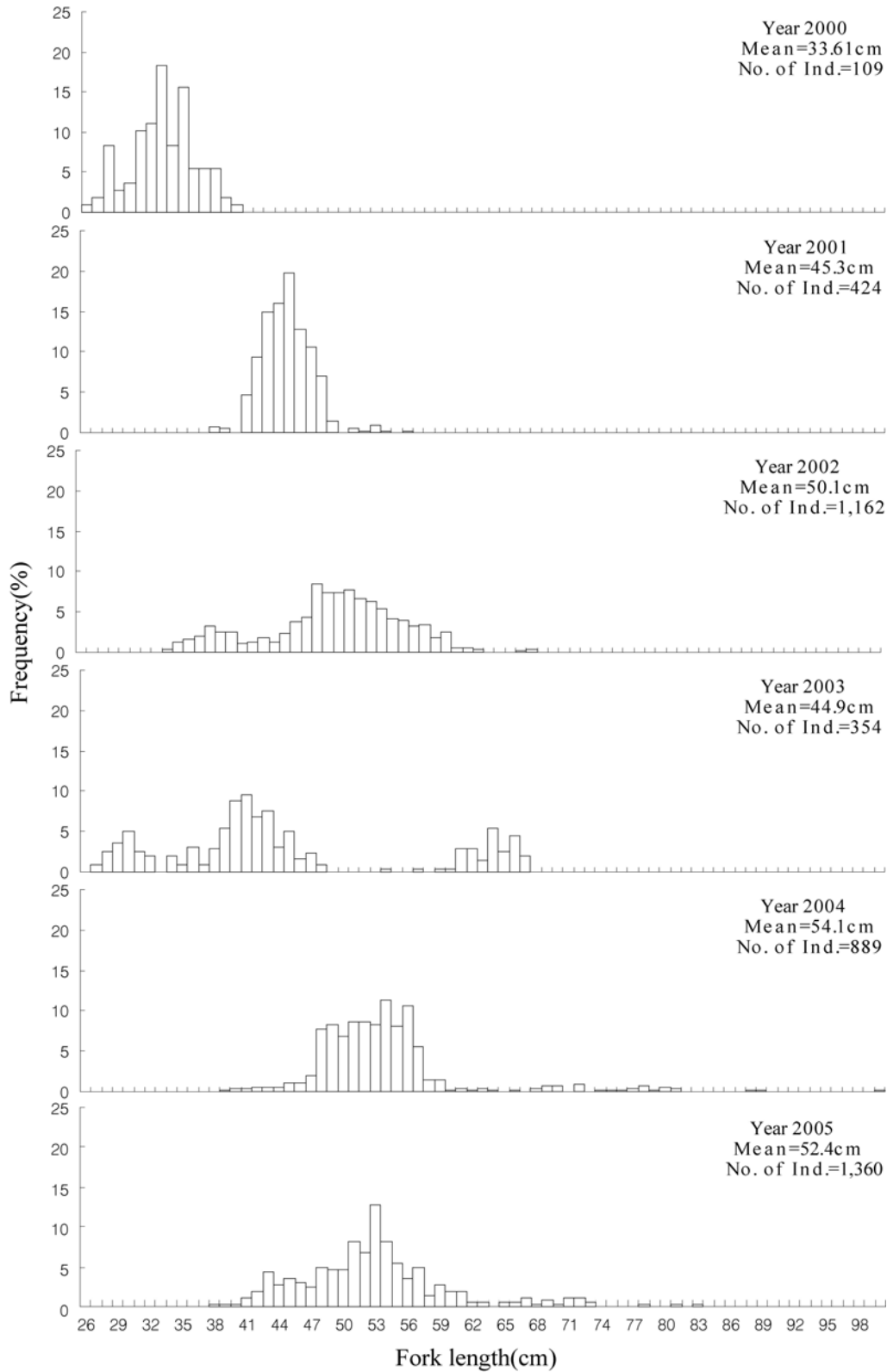


Fig. 2. Fork length frequency distribution of Pacific bluefin tuna by the Korean purse seine fishery during 2000 ~ 2005.

Size composition

To monitor the size of purse seiner caught PBF, monthly sampling was undertaken at a local

landing port for purse seine fishery. The range of fork length of Pacific bluefin tuna that is caught in South Korean offshore is between 26cm and 100cm, and mainly small individuals that are about 50cm and younger than 1 year are caught.

Fishing area

Since PBF is a by-catch species of offshore purse seine fishery targeting mackerels, catch distribution of this species depends on the distribution of target species and the degree of association between PBF, mackerels, jack mackerel and squid. Fishing area for PBF were mainly scattered in the southern waters of Korea near the Cheju and Tsushima Islands and nevertheless of catch amount was rare, occasional catch was taken in the Yellow Sea (Fig. 3). However, catch distribution shows annual fluctuation depending on fishing and oceanographic condition for target species.

Monthly distribution of PBF catch demonstrates that major catch were taken from April in 2005 and most of the catches were recorded in the southern waters of Cheju Island and some catch were also reported from coastal areas near Pusan and Tsushima Island during winter season. In contrast, in the year 2004 during April-July catches were made in the South Sea and Cheju Island and during September-November in the Yellow Sea.

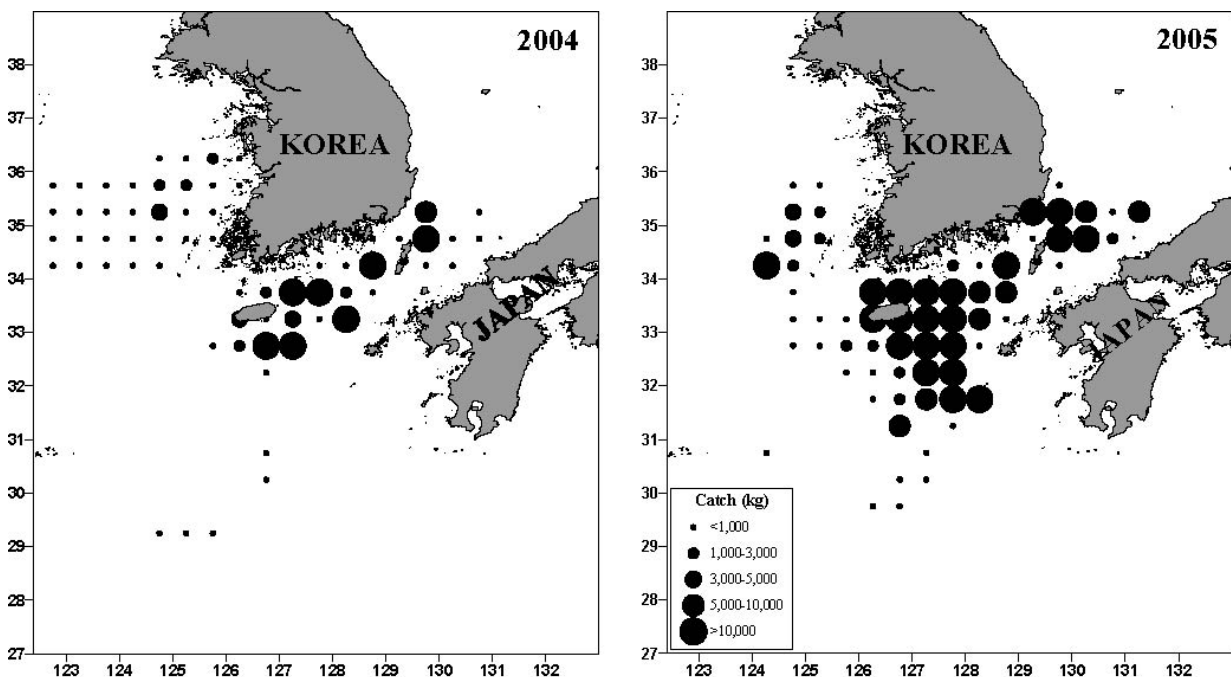


Fig. 3. Catch distribution of Pacific bluefin tuna by Korean purse seine fishery from 2004-2005.

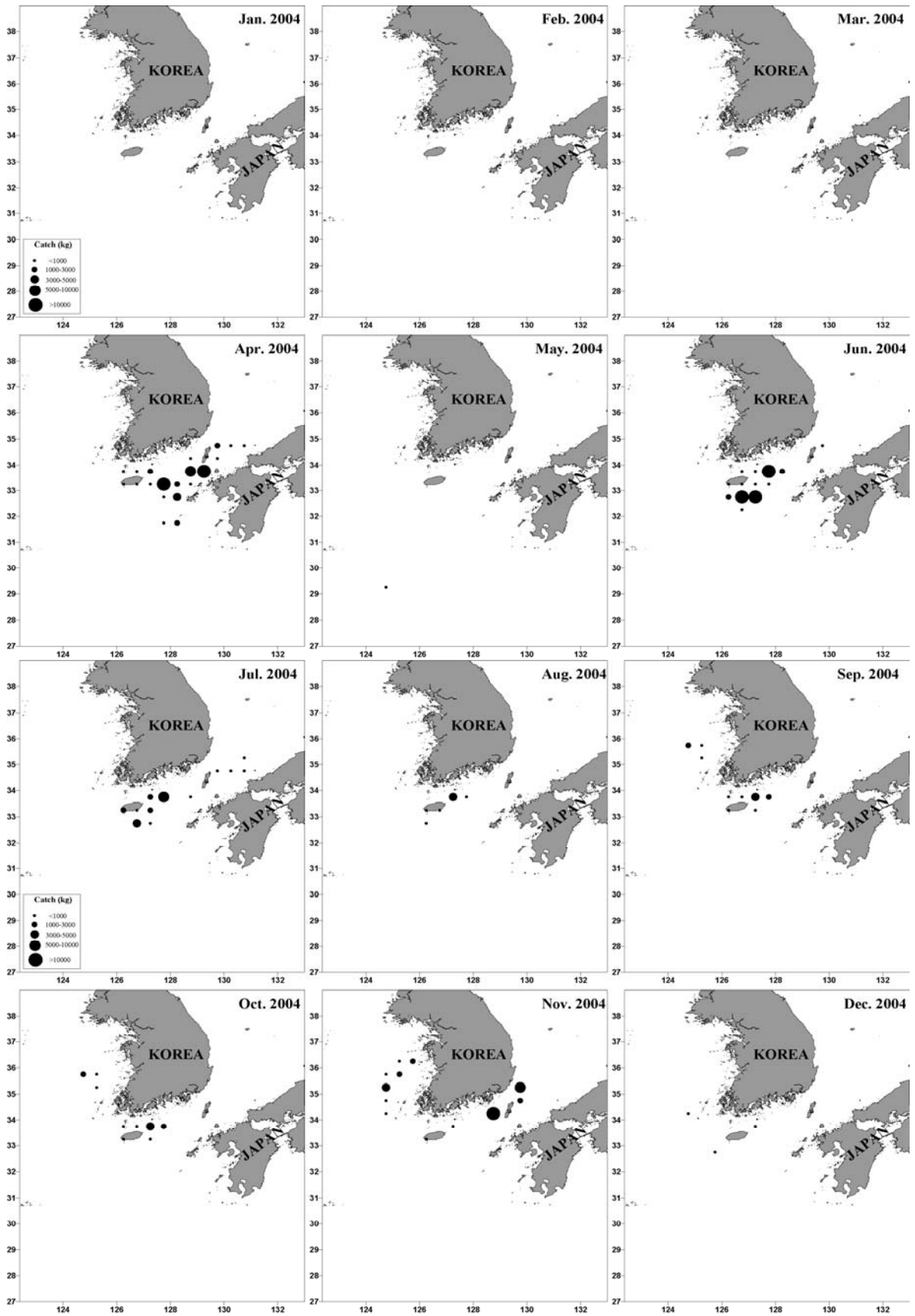


Fig.4-1. Monthly catch distribution of Pacific bluefin tuna by Korean purse seine fishery in 2004.

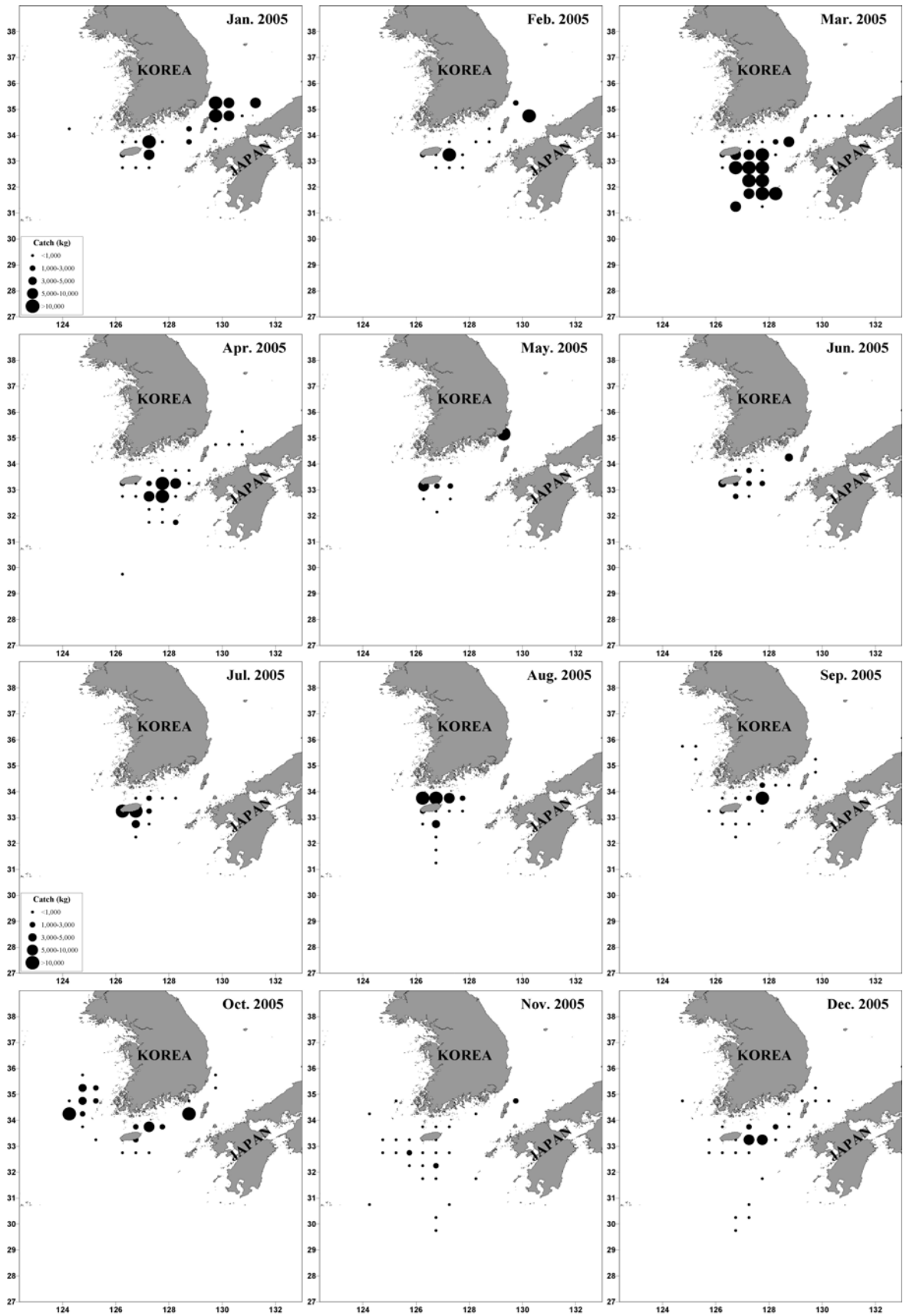


Fig.4-2. Monthly catch distribution of Pacific bluefin tuna by Korean purse seine fishery in 2005

Research Activities

The fisheries statistics data collection and compilation have been carried out by NFRDI for the scientific purposes in the calendar year. And also the monitoring of fisheries, biological sampling has been regularly carried out at every domestic landing sites.

NFRDI is reconstructed database system for handy manipulation and analysis of fisheries data. Old data files will be revisited and reviewed for the correction or verification of the existing statistics in year of 2005. Korean government (MOMAF) and NFRDI initiated the fisheries observer program for distant-water fisheries including tuna fisheries from 2002. In 2004-2005, five observers were deployed on Korean fishing vessel operating for the Scientific observation. During the trip, observers monitored catch of target and by-catch species.

To avoid or reduce mortality of seabird and sea turtle by tuna longline vessels, in 2005 guidebooks and posters for the information and release manual of these species were distributed to fishing boats including tuna longliners.