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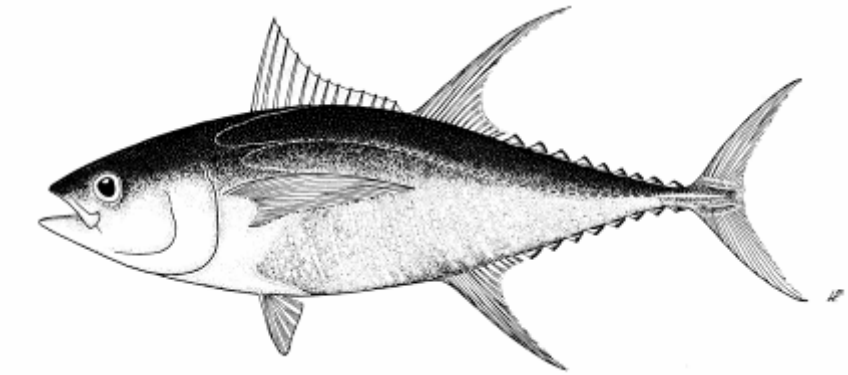
Korean Tuna Fisheries in the western and central Pacific Ocean



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Korean tuna fisheries in the Western and Central Pacific Ocean

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Brief Introduction

The history of Korean tuna fisheries dates back to the mid-1950s when Korean distant-water fishery began with small experimental longline fishing for tunas in the Indian Ocean. Since then the Korean tuna fishing fleet has annually grown to expand its power to the three major oceans before the 1970s. The number of tuna fishing vessels peaked in 1975 at around 600 followed by gradual decrease until recent years. Despite the decrease in fishing fleet size, the tuna fishery still remains the most important distant-water fishery in Korea, yielding more than 200,000 mt of tuna catch annually. Compared to the early 1990s, recent distribution of the Korean tuna fleet shows that all purse seiners and over 98% of the active longliners operate in the Pacific. Many registered vessels migrate between the Pacific and Indian Ocean, depending on the conditions of each fishing ground. The gear-type-based licensing in Korea, not limiting fishing grounds, enables the switching of fishing grounds for those tuna longliners.

Total tuna catch in the WCPFC area in 2004 was 216,556 mt from 190 tuna vessels, among which 183,490 mt and 33,066 mt were caught from 28 purse seiners and 162 longliners, respectively. Four major species comprised over 95% of total WCPFC tuna catch in 2004, among which 152,126 mt was for skipjack, 41,362 mt for yellowfin, 18,001 mt for bigeye and 1,163 mt for albacore.

Fleet structure

Korea's tuna fleet consists of longliners and purse seiners. The total number of tuna vessels operated by the Korean tuna industry has been decreasing since the mid-1970s (Fig. 1). Over 500 longliners in the mid 1970s, for example, has been reduced to around 200 in the year 2000. The number of purse seine vessels also decreased

from 39 in 1990 to 26-28 in recent years. Of around 200 licensed longliners for fishing in the Pacific, 160-180 vessels were operated in the WCPFC area during the past 5 years. In contrast, all purse seiners kept fishing exclusively in the WCPFC area. The number of longliners and purse seiners fishing in 2004 was 162 and 28, respectively, which represents a similar level to the previous year. Regarding vessel capacity, dominant sizes range from 300 to 500 GRT for longliners and 700 to 2000 GRT for purse seiners (Table 1) and this feature remained unchanged during the past 10 years.

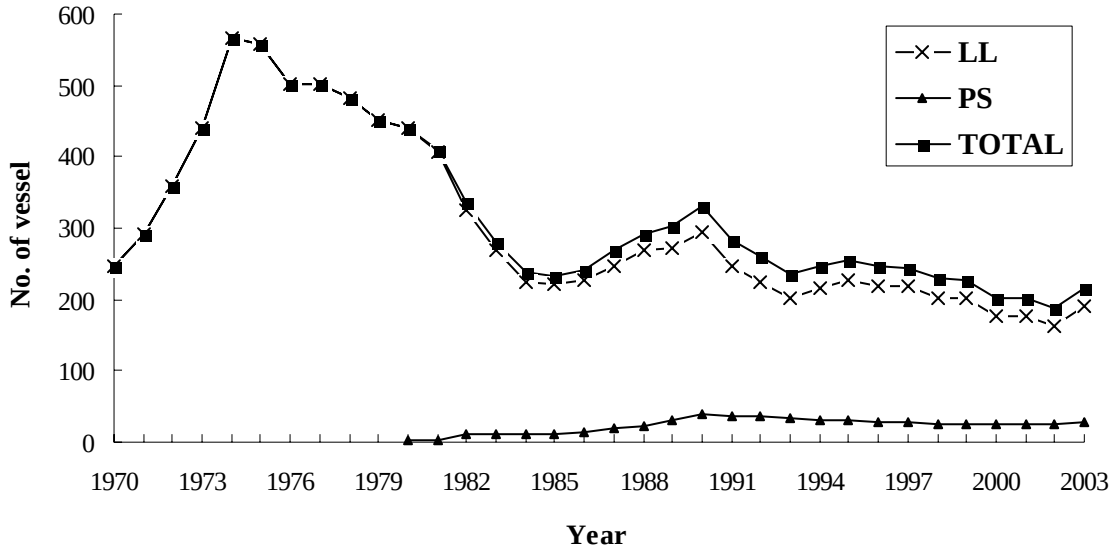

Fig. 1. Changes in Korea's annual tuna fleet structure, 1970-2003.

Table 1. Size class of Korean tuna fishing fleets operated in the WCPFC area in 2004

GRT By gear	Total Number of vessel	301-400	401-500	501-600	601-700	701-800	801-900	901-1000	1001-2000
Longliner	162	60	101	1					
Purse seiner	28					4	2	9	13

Annual catches in the WCPFC Convention Area, 2000-2004

In spite of the decreasing trend of fishing fleet size, annual catches of tuna by the Korean tuna fishery remain relatively constant at over 200,000 mt after 1990 until recent years. In general, the majority of tuna catches by the Korean fleet have been taken from the Pacific of which the Western and Central Pacific area accounted for over 90% of total Pacific catches. Tables 2 and 3 represent annual catch estimates for purse seine and longline fisheries during the past 5 years in the WCPFC area, respectively. WCPFC catches fluctuated from 210,000 to 260,000 mt and averaged 230,000 mt. Almost 97% of the total catch in the WCPFC area was composed of three tunas, skipjack, yellowfin and bigeye, and among which skipjack was dominant, comprising about 66% of the total catch (Fig. 2). Although yellowfin and bigeye are the second most important species in quantity, 21% and 10%, respectively, both species represent higher commercial value than skipjack as they are caught in longline fishery and sold in the sashimi market. Billfishes were incidentally caught in both purse seine and longline fisheries and among them, the blue marlin was dominant in the catches. Sharks were also reported as bycatch species from the longline fishery but due to onboard identification difficulties they were reported as a group and not by species.

In general, the Korean tuna purse seine fishery occurs in the tropical area of the Western and Central Pacific between 140^{o}E-180^{o} and rarely extends to the east over 170^{o}W, depending on oceanographic conditions such as the El-Nino events (Fig. 3). In contrast, longline fishery occurs in the tropical area of the whole Pacific, between 20^{o}N and 20^{o}S and longliners are shifting freely from one place to another within their traditional fishing grounds or to another ocean for efficient catch (Fig. 4).

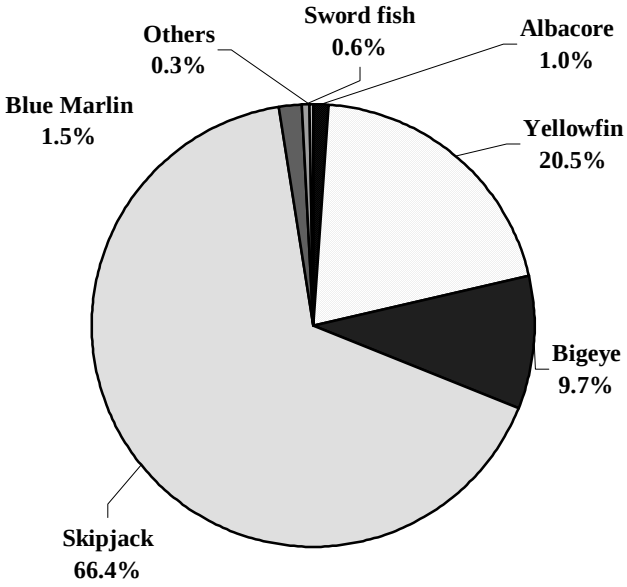

Fig. 2. Catch composition of Korean tuna fisheries.

Table 2. Annual catch estimates (mt) for Korean tuna purse seine fishery in the WCPFC area, 2000-2004

Year	Total	Skipjack	Bigeye	Yellowfin	others
2000	169,798	141,113	87	28,598	0
2001	178,072	143,503	266	34,303	0
2002	206,150	166,867	144	39,127	12
2003	189,322	153,447	141	35,735	0
2004	183,490	152,126	60	31,304	0

Table 3. Annual catch estimates (mt) for Korean tuna longline fishery in the WCPFC area, 2000-2004

Year	Total	Albacore	Yellowfin	Bigeye	Bluefin	Skipjack	Blue Marlin	Striped Marlin	Sword fish	Black Marlin	Sail fish	Sharks	Others
2000	42,064	837	12,991	23,867	14	5	2,324	271	1,530	96	3	64	62
2001	44,564	2,675	13,768	22,172	18	4	3,868	279	1,480	164	2	92	42
2002	54,782	4,415	15,497	28,533	2	10	3,845	341	1,745	211	10	129	43
2003	38,813	2,465	12,134	17,151	4	6	4,962	351	1,316	165	11	209	38
2004	33,066	1,163	10,058	17,941	3	3	2,310	163	1,203	113	7	84	19

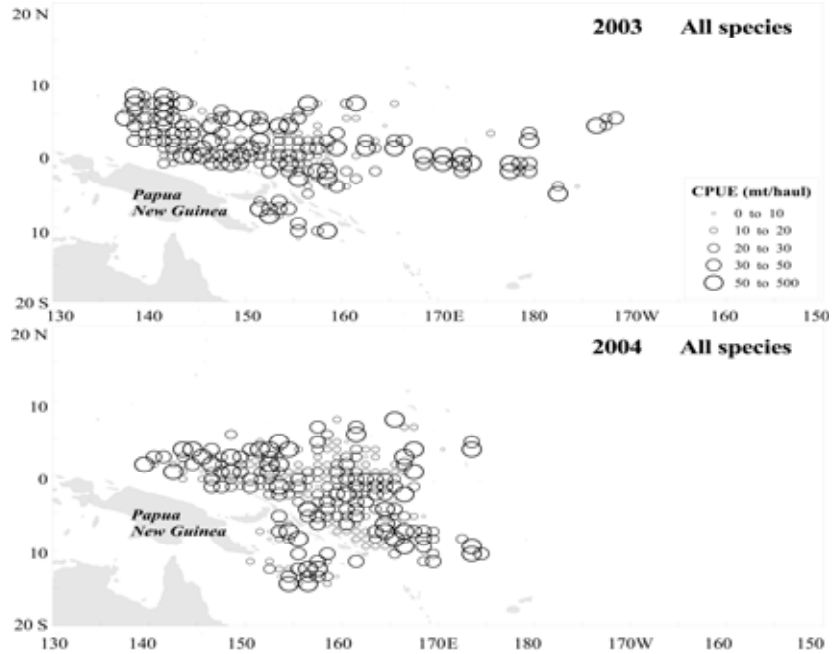

Fig. 3. Distribution of Korean tuna purse seine fishing area in the Pacific Ocean.

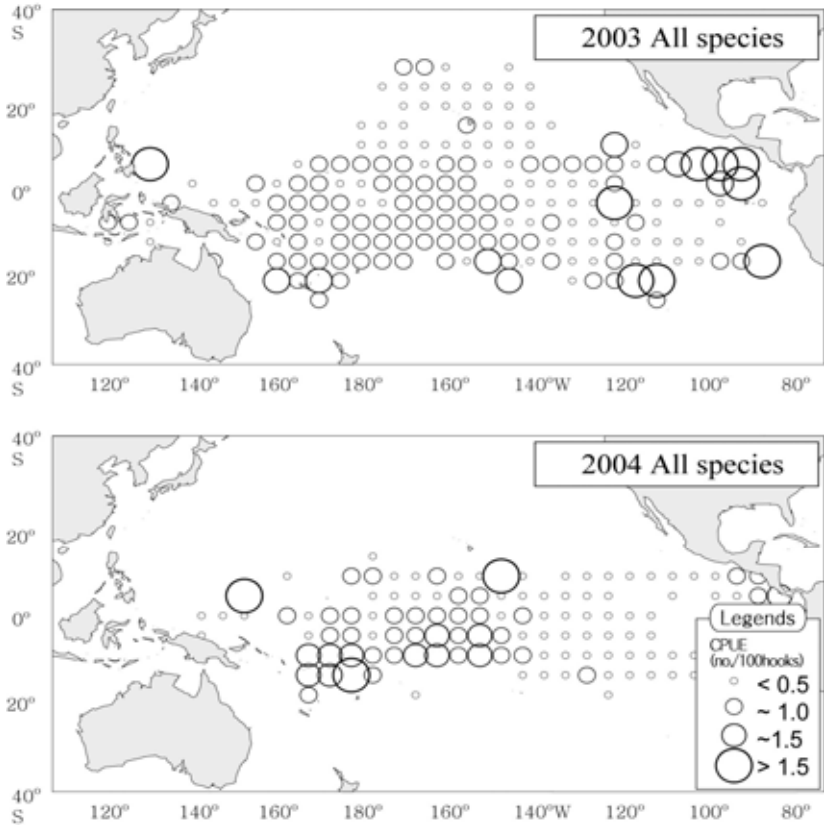

Fig. 4. Distribution of Korean tuna longline fishing area in the Pacific Ocean.

Annual catches in member or observer's EEZ, 2000-2004

Since Korea is located at the margin of distribution area of tuna species in the north Pacific, its tuna catch within the EEZ has been very limited. At a local fish market in Busan, southern coastal area of Korea, some tuna species such as Pacific bluefin tuna (PBT) and skipjack are occasionally landed. Previously, these tuna species have not well been documented due to small quantity and low price in the domestic market and were treated as miscellaneous fish.

PBT are caught incidentally by various fishing gears - purse seine, trawl, set net and dragged gears - in the coastal waters of Korea but the major gear taking the most of PBT bycatch is domestic purse seine fishery that targets mackerels. The PBT caught in Korean waters mainly consists of juveniles smaller than one meter long (fork length) and most of them are exported to Japan and some minor quantity are consumed in the domestic market. The annual catch of PBT by Korean domestic purse seiners ranged from about 600 to 1,600 mt during the past 5 years (Table 4). Since PBT is a by-catch species of offshore purse seine fishery, catch distribution of this species largely depends

on the distribution of target species and the degree of association between PBT and mackerels.

Table 4. Bycatch of Pacific bluefin tuna by Korean coastal and offshore fisheries

Year	Catch (mt) by gear		
	Purse seine	Trawl	Total
2000	794	0	794
2001	995	10	1,005
2002	674	1	675
2003	1,591	0	1,591
2004	636	0	636

Final market destination of catches

Korean tuna fisheries depend on overseas markets to an extent that a large portion of catches is exported to Japan and other international markets. This is mainly because the domestic market is still growing and not big enough yet to accommodate for a substantial amount of tuna caught by the Korean fleet.

As shown in Table 5, about 40,000-50,000 mt of longline-caught tuna and 60,000-90,000 mt of purse seine-caught tuna were exported annually. The amount of exports by the Korean longline and purse seine fleet accounted for 70-82% and 39-47% of the total fleet catch, respectively. The remainder was consumed in the domestic market by either sashimi or cans. A major import country of the Korean longline catch was Japan, consuming 97% of Korea's exported frozen tuna in its sashimi market in 2003. The remaining 3% was exported to Fiji and Thailand. Korea's overseas market for the purse seine catch was more diverse than that for longline. In 2003, Thailand was the most important market followed by Japan and Taiwan. EC, Samoa, Fiji, and the Philippines shared a small percentage of exports. The amount of exports varies by the price of tuna in both domestic and overseas markets.

Table 5. Export statistics by year (mt, 1,000US$)

Year	LL	PS

	Amount	Value	Amount	Value
2003	36,626	169,104	84,476	62,396
2002	50,933	200,939	91,934	77,438
2001	43,830	199,981	81,820	73,184
2000	48,347	284,005	79,581	66,668
1999	39,304	245,123	55,027	47,001

Developments concerning tuna fisheries research and statistics

Observer program

The Ministry of Maritime Affairs and Fisheries (MOMAF) of Korea initiated the development of an observer program for distant-water fisheries including tuna fisheries in 2002. The purpose of this program is to meet the requirements of relevant regional fishery bodies such as the WCPFC and therefore the mission of trained observers are similar to those set out in the convention of the fishery bodies. In 2004, a total of 3 trained observers were deployed to monitor Korean tuna longline and purse seine fisheries, of which two cruises were conducted in the Pacific Ocean. A summary of their activities was presented as an information paper at the 1st WCPFC Scientific Committee meeting. A similar level of observer activities will be carried out for the Pacific tuna fisheries this year.

Circle hook experiment to reduce sea turtle bycatch in longline fishery

Since concerns of sea turtle bycatch in longline fisheries have been raised in various international meetings, the Korean government funded an experiment with circle hooks to investigate if circle hooks can solve this international problem of sea turtle mortality. The experiment will be carried out by NFRDI scientists aboard a commercial Korean longliner operating in the Eastern Pacific during July and August 2005, in collaboration with a US scientist from the National Marine Fisheries Service Honolulu Laboratory. The results of this experiment will be reported later.

Data reporting system

Tuna catch statistics of Korea are obtained from two sources of data reports. Korea Deep-Sea Fisheries Association (KODEFA) collects total catches by gear from Korean tuna industries, which are used as our official total catch. National Fisheries Research and Development Institute (NFRDI) collects logsheet sampling data from vessels. The annual catch estimates for the WCPFC area presented in Tables 2 and 3

were based on these logsheet data since KODEFA collects data for the whole Pacific not by geographical area. The logsheet contains location, catches by species, number of hooks, etc.

It is our current domestic regulation that distant-water fishing vessels are obliged to report their catch statistics to NFRDI when it returns to home port. But since one trip of a Korean tuna vessel generally lasts more than one year, it is hard for scientists to collect data from fishing vessels to meet the deadline of data submission set by international fisheries organizations. This is the main reason that coverage of purse seine and longline fisheries is usually well below 100% at the time of data submission; however, low coverage rates are compensated by the further collection of logsheets, which possibly make changes in catch estimates.

NFRDI is currently reconstructing a database system for handy manipulation and analysis of fisheries data by fishery scientists. Old data files will be revisited and reviewed for the correction or verification of the existing statistics. Therefore, we do not exclude a possibility of minor correction in our previous statistics. However, this can be interpreted as a strenuous effort on Korea's part to collaborate with all regional fishery organizations for the better understanding of our fishery statistics.

Compilation of fishermen's guide to bycatch

Although data collection on bycatch species is not among fishermen's responsibilities, Korea encourages fishermen to do so. To solve practical problems that fishermen usually encounter when they record bycatch species, we are compiling a fishermen's guide to bycatch species in the tuna longline and purse seine fisheries. This guide will provide color drawings or photos of bycatch species and help fishermen in identifying various bycatch species including fish, sea turtles, sea birds and etc. Once completed by the end of this year, the guide will be distributed to fishermen of distant-water fishing vessels with a view to facilitating their collection of bycatch information from their fisheries.