SCIENTIFIC COMMITTEE
FOURTH REGULAR SESSION

11-22 August 2008
Port Moresby, Papua New Guinea

ANNUAL REPORT – PART 1
INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

WCPFC-SC4-AR PART 1/WP-15

REPUBLIC OF KOREA

2008 ANNUAL REPORT TO THE COMMISSON

Republic of Korea

Part 1. INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

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Summary

Over 90% of Koreas total Pacific Ocean tuna catches are taken from the WCP-CA. WCP-CA catches fluctuated from 216,000 to 281,000 mt and averaged 251,000 mt. Purse seine catches during the last five years ranged from 183,000 mt to 258,000 mt, averaging 219,000 mt. Skipjack and yellowfin tuna comprised 74.4% and 19.2% of this catch, respectively. The Korean longline fishery targets bigeye and yellowfin tuna, with minor catches of albacore, and comprises 86.3% of the total catch. Billfish and other fish species are incidentally caught in longline fishery. The total annual catches in the WCPO ranged from 23,000 mt to 39,000 mt by the longline fishery during the past 5 years. The number of longliners and purse seiners fishing in 2007 was 122 and 26-28, respectively, which represents a decrease by 10 longliners compared to the previous year.

The Ministry for Food, Agriculture, Forestry & Fisheries (MIFAFF) of Korea initiated the development of an observer program for distant-water fisheries, including tuna fisheries, in 2002. In 2007, a total of 12 observer trips with 958 days were conducted to monitor Korean tuna longline and purse seine fisheries, of which 5 cruises were carried out in the Pacific Ocean.

Monthly biological sampling for purse seine catch has been carried out at a domestic landing site once a month since 1993, to obtain size data and information on the reproductive biology of yellowfin and skipjack tuna. A total of 316 skipjack, 1207 bigeye, 772 yellowfin and 341 albacore tunas were sampled for morphometric measurements and GSI index during 2007.

Since concerns regarding sea turtle bycatch in longline fisheries have been raised in various international meetings, the Korean government has funded an experiment to investigate if circle hooks can solve this international problem of sea turtle mortality. The experiment was carried out by NFRDI scientists aboard a commercial Korean longliner operating in the Eastern Pacific during July-August 2005 and September-October 2006. This experimental survey was repeated with various types of circle hooks during the period August-September 2007. To solve practical problems that fishermen usually encounter when they record bycatch species, NFRDI issued the 2nd edition of fish atlas of ‘Fishes of the Pacific Ocean’ in 2007.

Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission on the 30th April 2008	**YES**

1.1 ANNUAL FISHERIES INFORMATION

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. Many registered vessels migrate between the Pacific and Indian Ocean, depending on the conditions of each fishing ground.

1.1.1 Annual catch by species, gear in the WCPFC Convention Area

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. Table 1 represent annual catch estimates for the Korean fleets, by gear (purse seine and longline) during the past 5 years in the WCPFC Convention area and whole Pacific Ocean. WCPFC catches fluctuated from 216,556 to 281,059 mt and averaged 250,902 mt. Almost 97.2% 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 71.4% of the total catch (Fig. 1). Although yellowfin and bigeye are the second most important species in quantity, 19.9% and 5.9%, respectively, both species represent higher commercial values than skipjack as they are caught in longline fishery and sold in the sashimi market.

Table 1. Annual catch estimates for the Korean fleets, by gear for the WCPFC Convention Area and whole Pacific Ocean, for years 2003 to 2007

Year	Pacific Ocean			WCPFC		
	TOTAL	PS	LL	TOTAL	PS	LL
2003	242,198	193,788	48,410	228,135	189,322	38,813
2004	234,777	186,276	48,501	216,556	183,490	33,066
2005	258,350	213,212	45,138	248,224	209,790	38,434
2006	293,076	253,170	39,906	280,537	253,170	27,367
2007	298,171	258,177	39,994	281,059	258,177	22,882

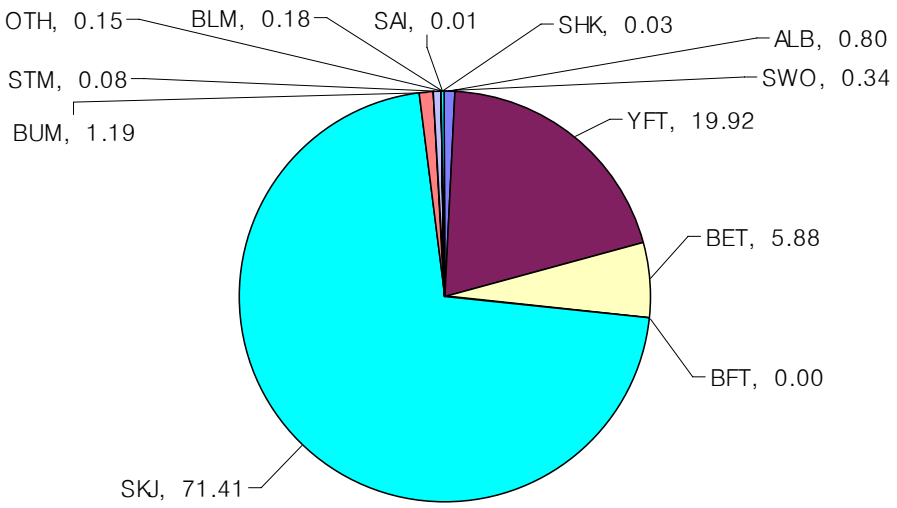

Fig. 1. Catch composition (averaged 2003-2007) of Korean tuna fisheries.

Purse seine fishery

Purse seiners have been concentrating their fishing activities in the Western Pacific throughout the year. Since 1990 when the number of vessel s was 39, there has been a steady decrease in number of the purse seiners operating in this region and only 28 purse seiners remained in 2007. The total catches from this fishery during the last five years ranged from 183,000 mt to 258,000 mt averaging 218,000 mt, among which skipjack and yellowfin tuna comprised 81.9% and 17.9% of total catch, respectively (Fig. 2 and Table 2).

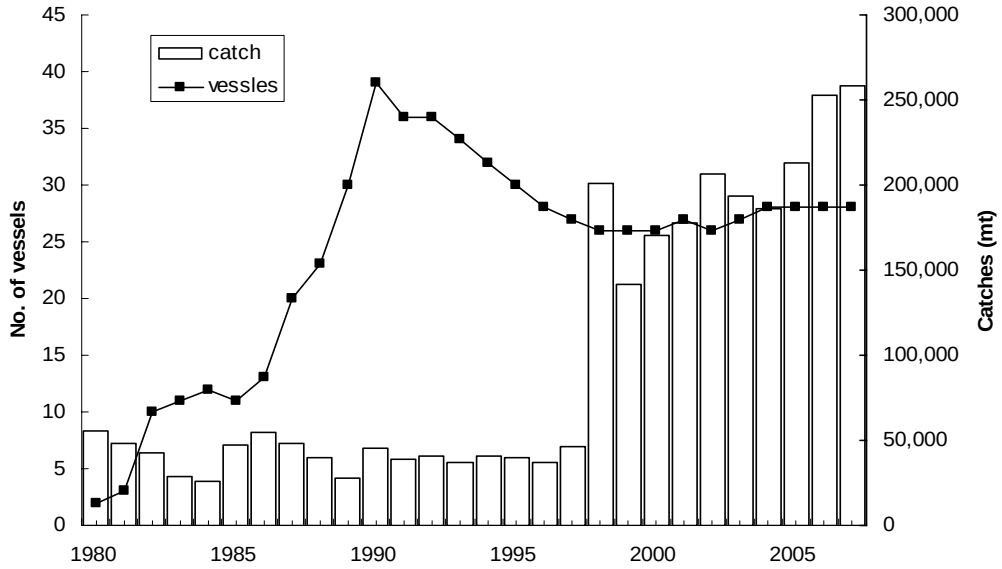

Fig. 2. Annual catch and number of vessel of Korean tuna purse seine fisheries.

Table 2. Annual catch estimates for the Korean purse seiners by primary species, for the WCPFC Convention Area , for years 2003 to 2007

Year	TOT	SKJ	BET	YFT	OTH
2003	189,323	153,447	141	35,735	-
2004	183,490	152,126	60	31,304	-
2005	204,500	166,280	-	38,202	18
2006	253,170	205,220	28	46,542	1,380
2007	258,177	214,933	-	43,244	-

Longline Fishery

Korean longline fishery targets bigeye and yellowfin tuna with minor catches of albacore, comprising 86.3% of the total catch, and billfishes and other fish species are incidentally caught in this fishery. The total annual catches in the WCPFC area ranged from 22,900 mt to 38,800 mt during the past 5 years as shown in Table 3. Recent decrease in longline catch was resulted mainly from decreased bigeye catch from over 18,000 mt in 2004 to about 10,000 mt in 2007, a decrease by 45%. Annual shift of longliners from east to west and vice versa might have contributed to the annual catch fluctuations and changes in species composition in longline

fishery (Fig. 3 and Table 3).

Table 3. Annual catch estimates for the Korean longliner by primary species, for the WCPFC Convention Area , for years 2003 to 2007

Year	TOT	ALB	YFT	BET	BFT	SKJ	BUM	STM	SWO	BLM	SAI	SHK	OTH
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
2005	38,434	3,919	13,329	15,622		1	4,120	260	737	272	91	78	5
2006	27,367	1,050	9,529	12,489		1	3,301	171	708	42	14	55	7
2007	22,882	1,433	8,817	10,054	6	1	166	54	245	1,693	-	-	413

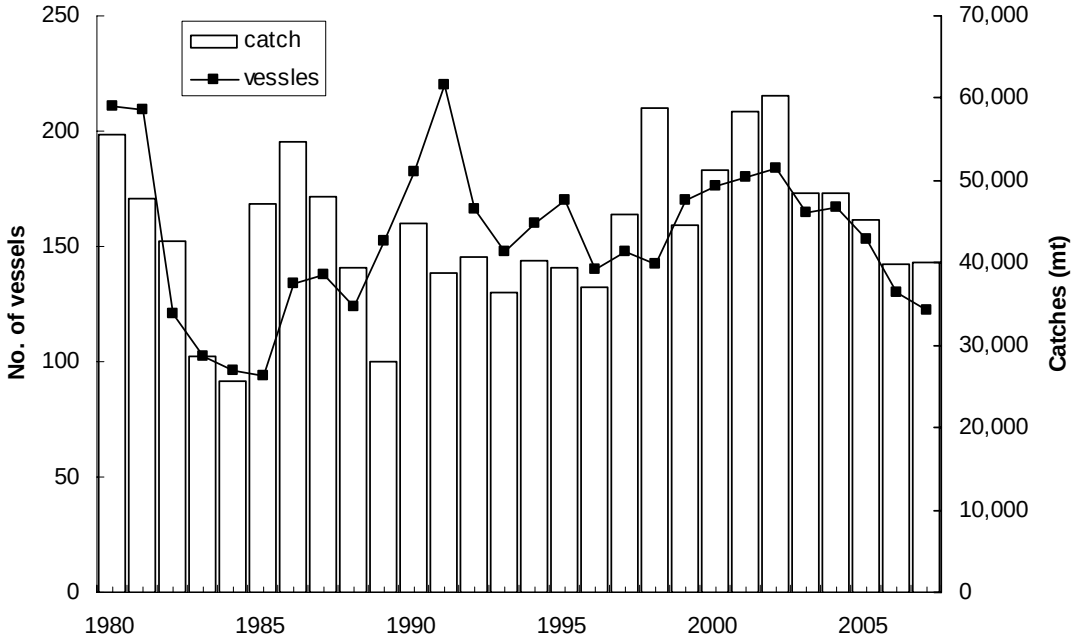

Fig. 3. Annual catch and number of vessel of Korean tuna longline fisheries

1.1.2 Number of vessels by gear type, size (fleet structure)

Korea's tuna fleets consist 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. 4). 220 longliners in 1991, for example, has been reduced to 122 in the year 2007. 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, about 120-170 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 2007 was 122 and 28, respectively, which represents a decrease by 8 longliners compared 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 4) and these features remained unchanged during the past 5 years.

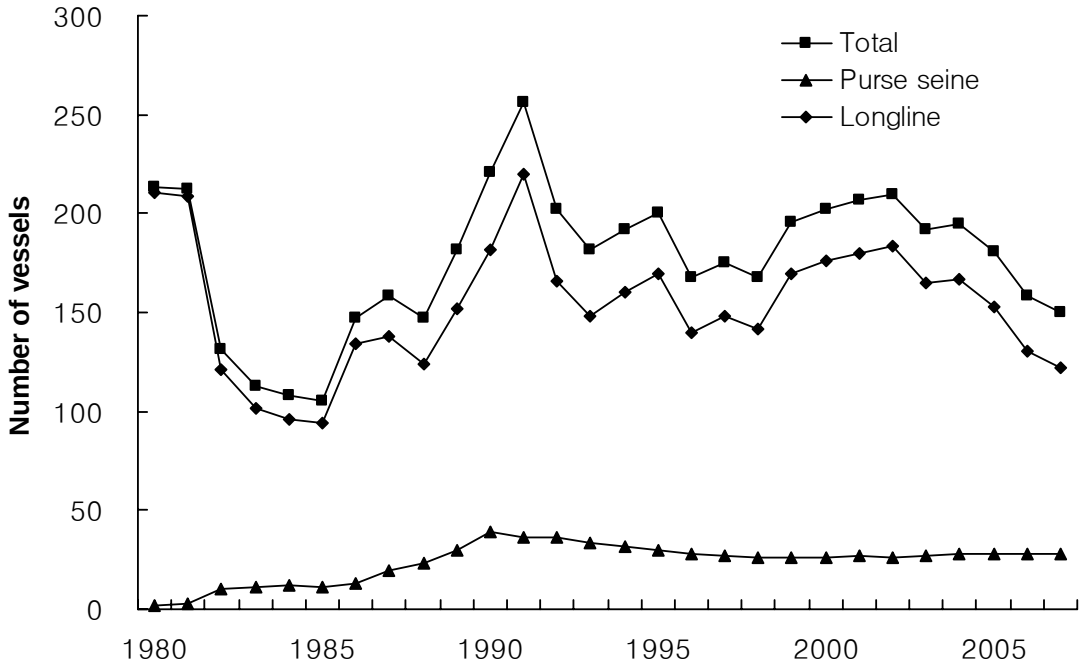

Fig. 4. Changes in Korea's annual tuna fleets structure, 1980~2007

Table 4. Number of Korean vessels, by gear and size category, active in the WCPFC Convention Area for years 2003 to 2007

GRT	Gear	2003	2004	2005	2006	2007
Total	**Longline**	165	167	153	130	122
	Purse seine	27	28	0	28	28
301-400	**Longline**					
	Purse seine	1				
401-500	**Longline**					
	Purse seine	1	1		1	1
501-600	**Longline**					
	Purse seine					
601-700	**Longline**					
	Purse seine					
701-800	**Longline**					
	Purse seine	6	7		8	8
801-900	**Longline**					
	Purse seine	2	3		2	2
901-1,000	**Longline**					
	Purse seine	5	4		4	4
1,001-2,000	**Longline**					
	Purse seine	12	13		12	12
2,001-3,000	**Longline**					
	Purse seine				1	1

1.1.3 Fishing grounds

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 160^{o}W, depending on oceanographic conditions such as the El-Nino events (Fig. 5). 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. 6).

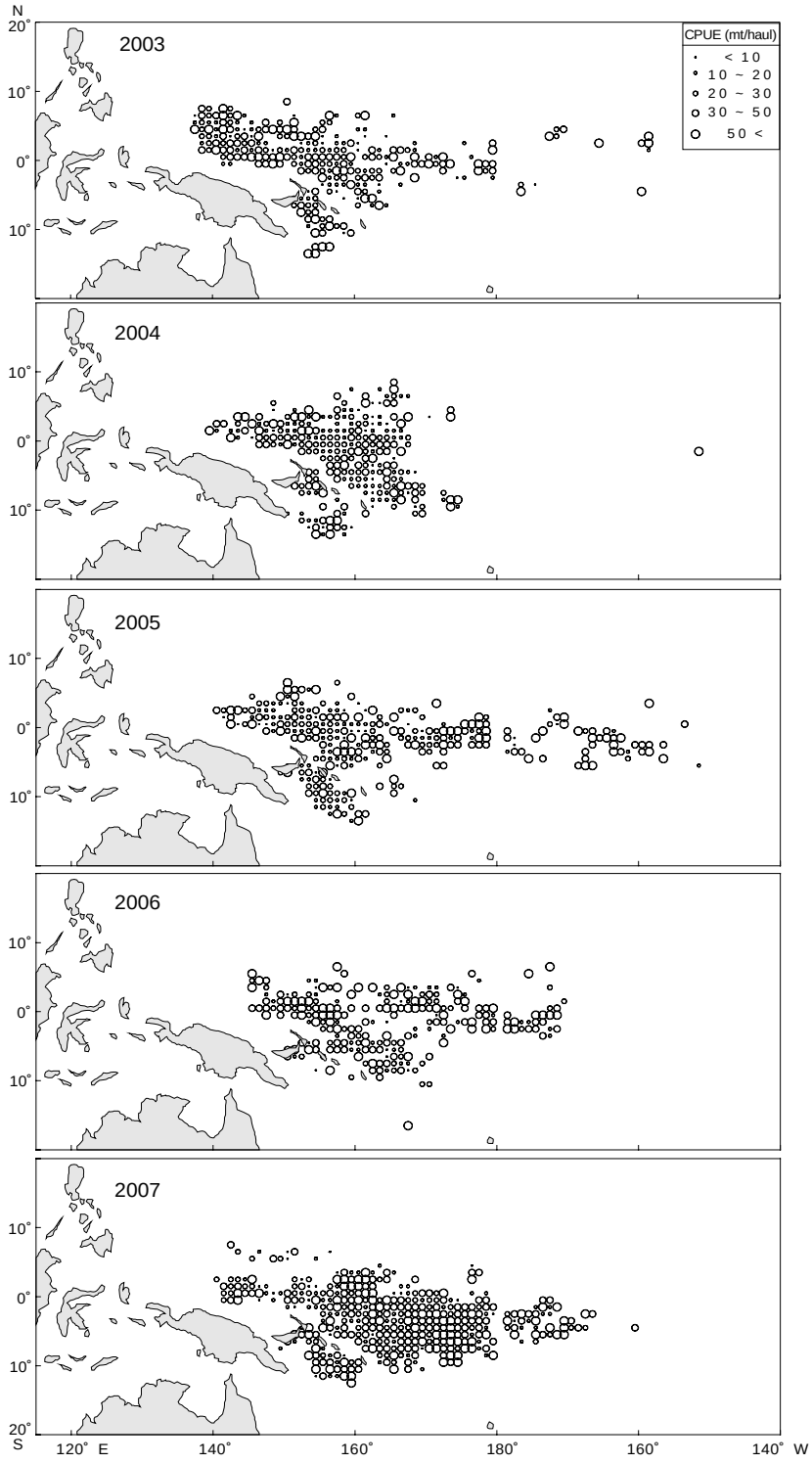

Fig. 5. Distribution of Korean tuna purse seine fishing area in the Pacific Ocean.

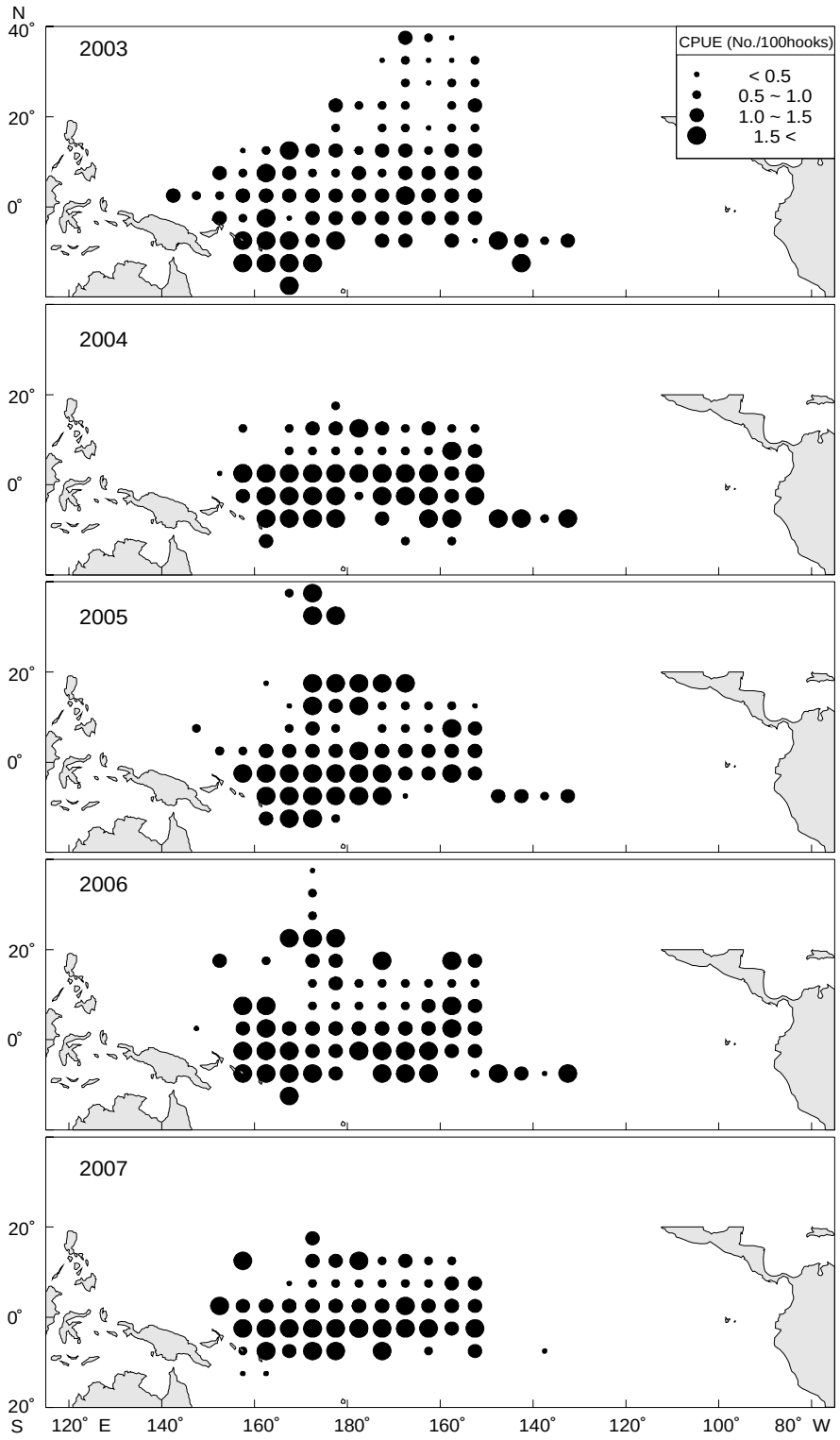

Fig. 6. Distribution of Korean tuna longline fishing area in the Pacific Ocean

1.1.4 Estimated total catches of non-target, associated and dependent

Billfishes, such as blue marlin, swordfish, striped marlin, black marlin and sailfish have been caught as by-catch species by Korean longliners (Table 2). The proportion of billfish catches was averaging 14% of total catch during the past 5 years. Species composition of billfish catches showed that blue marlin consisted of higher proportion, over 66% , than other species. 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.

1.2 RESEARCH AND STATISTICS

1.2.1 Summary of observer and port sampling programs

Observer program

The Ministry for Food, Agriculture, Forestry & Fisheries (MIFAFF) 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 2007, a total of 12 observer trips with 958 days were conducted to monitor Korean tuna longline and purse seine fisheries, of which 5 cruises were carried out in the Pacific Ocean. A summary of their activities was presented as an information paper at the WCPFC Scientific Committee meeting. A similar level of observer activities will be carried out for the Pacific tuna fisheries this year.

Biological sampling

Biological sampling for purse seine catch has been carried out by on-board observer to obtain size data and information on reproductive biology of yellowfin tuna and skipjack tuna. A total of 316 skipjack tuna and 83 yellowfin tuna were sampled for morphometric measurement and GSI index during 2007. The ranges of fork length were 17-72 cm (50.9 cm) for skipjack tuna and 30-156 cm (98.3 cm) for yellowfin tuna, respectively(Fig. 7).

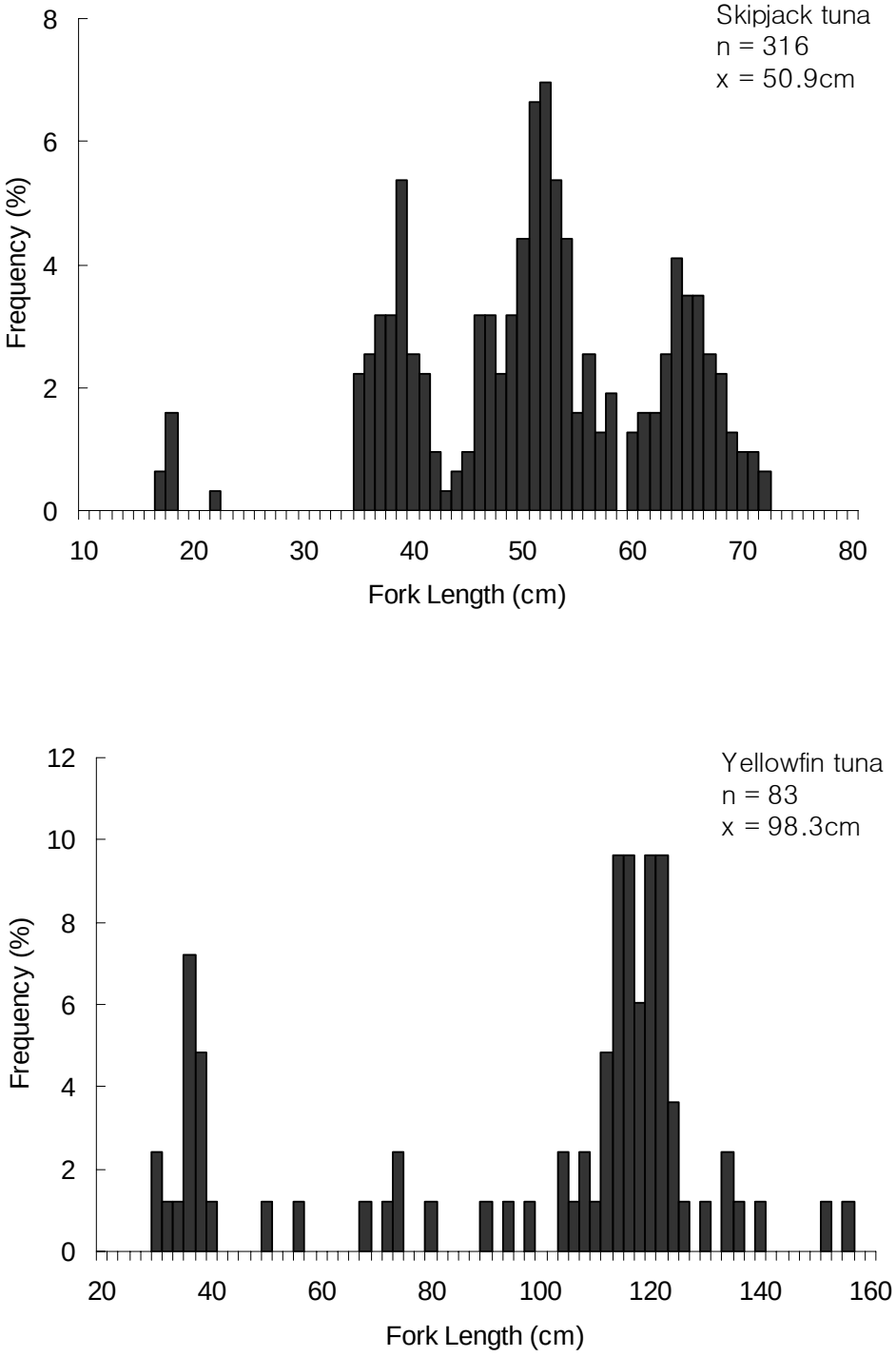

Fig. 7. Length distribution of skipjack tuna and yellowfin tuna caught by Korean purse seiners, 2007

Biological sampling for longline catch has been carried out by on-board observer to obtain size data and information on reproductive biology of bigeye, yellowfin and albacore. A total of 1,207 bigeye tuna , 689 yellowfin tuna and 341 albacore were sampled for morphometric

measurement and GSI index during 2007. The ranges of fork length were 56-194 cm (127.1 cm) for bigeye tuna, 60-170 cm (121.7 cm) for yellowfin tuna and 56-116 cm (97.0 cm) albacore, respectively (Fig. 8).

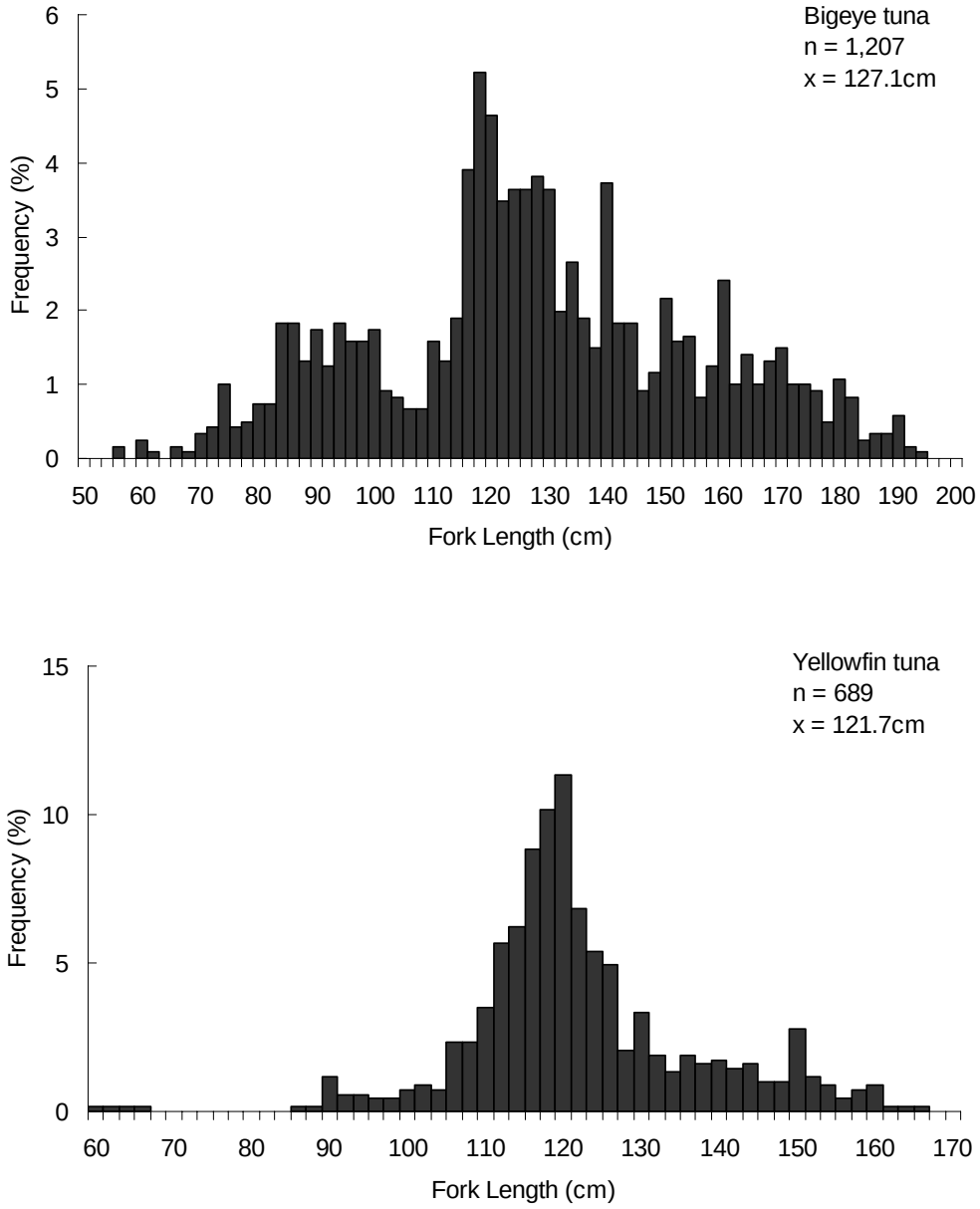

Fig. 8. Length distribution of bigeye tuna, yellowfin tuna and albacore caught by Korean longliners, 2007

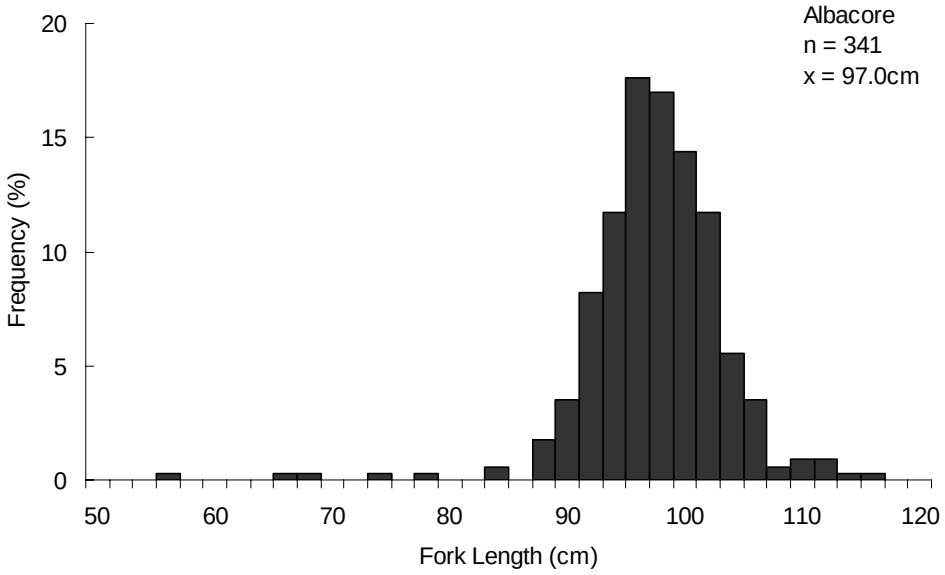

Fig. 8. (continued).

1.2.2 Research Activities

Circle hook experiment

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 was carried out by NFRDI scientists aboard a commercial Korean longliner operating in the Eastern Pacific during July-August 2005 in collaboration with a US scientist from the National Marine Fisheries Service Honolulu Laboratory, and September-October with difference types of circle hooks. The results of this experiment were submitted to the 2nd and 3rd WCPFC Scientific Committee meeting. This experimental survey was repeated with various types of circle hooks during August-September 2007.

Compilation of bycatch guide to fishermen

Although data collection on bycatch species is not yet among fishermen's responsibilities, Korea encourages fishermen to do so. To solve practical problems that fishermen usually encounter when they record bycatch species, NFRDI issued the 2nd edition of fish atlas of 'Fishes of the Pacific Ocean' in 2007. This atlas guide provides color drawings or

photos of 603 fish species and will be helpful to fishermen in identifying various target and bycatch species

1.2.3 Statistical data collection 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 1, 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 they returns to home-based port. But since one trip of a Korean tuna vessel generally lasts more than 20 months, 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.