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A SUMMARY OF THE KOREAN TUNA FISHERY OBSERVER PROGRAM FOR THE PACIFIC OCEAN IN 2007

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A Summary of the Korean Tuna Fishery Observer Program for the Pacific Ocean in 2007

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Korea began to develop its observer program for distant-water fisheries including tuna fisheries in 2002. The purpose of this program is to meet the requirements of relevant regional fisheries bodies such as the WCPFC and therefore the mission of trained observers are similar to those set out in the convention of the fisheries bodies. Before the official observer program was launched, Korea had irregularly dispatched NFRDI scientists aboard commercial tuna vessels to monitor fisheries and collect reliable catch statistics including biological samples, which were unobtainable by the regular data collection system. During the past 10 years, a total of 12 scientific observations were conducted for tuna fisheries operating in the Western and Central Pacific where the majority of Korean tuna purse seiners and longliners were active.

In 2008, 4 observers were deployed to monitor tuna fisheries in the Pacific Ocean. Results of the four observer trips conducted in the Pacific during 2007~early 2008 were summarized.

Purse seine fishery

The Western and Central Pacific Ocean (WCPO) serves as a usual fishing ground for the Korean tuna purse seine fishery since the early 1980s. To monitor this fishery, one trained observer was placed aboard Korean tuna purse seine vessel (1,349GRT) targeting skipjack and yellowfin tuna during June 7 - July 16, 2007.

The purse seiner was equipped with radars, color video and scanning fish founders, doppler sonar current meter, net depth recorder and so on and were operating auxiliary boats consisting of a skipper boat, net boat and one speed boat. To locate tuna schools, Korean tuna purse seiners usually carry helicopters. The purse seine net used by the monitored Korean purse seiners was about 1,790 m in length and it was deployed about 110-210 m in depth.

During the 40 days of the observation period, a total of 35 purse seine sets were monitored in the waters off the Kiribati, between 00°26'S-03°53'S and 156°30'-174°34'E (Fig. 1).

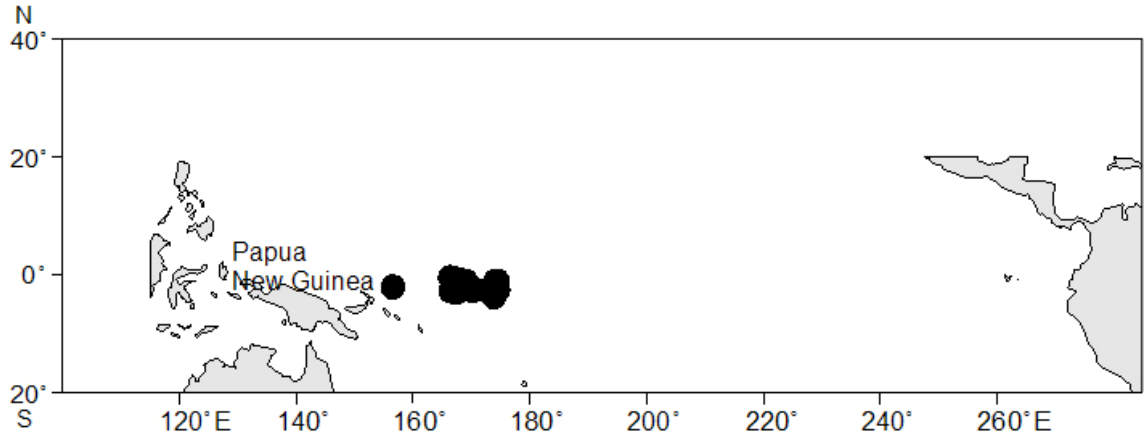

Fig. 1. Purse seine observation points.

The sets consisted of 32 free-swimming school sets and 2 log-associated school sets (Table 1). The success rate of operating sets with 15.0mt or more of tuna catch were 66% for free-swimming school sets and 100% for log-associated school sets. Total observed catches were 921mt for target species and 182mt for bycatch species. Catch composition for target species averaged 69% for skipjack and 31% for yellowfin. Catch per unit effort (CPUE, mt/set) of this fishery was 27.6 mt/set on average and CPUE of log-associated school sets was 110.2 mt/set.

Bycatch were observed in 2 log-associated school and 10 free-swimming school sets. However, it was not possible for us to list all bycatch species to the species level due to the lack of data from the observer. 2 sharks and some miscellaneous fish species (i.e. rainbow runner, file fish, dolphinfish etc.) were recorded.

Length frequency data of skipjack and yellowfin tuna was also collected by the observer. A total of 316 skipjack and 83 yellowfin tuna were measured onboard (Fig. 2). The fork length of target species ranged 17-72cm (mean 50.9cm) for skipjack tuna and 29-156cm (mean 98.3cm) for yellowfin tuna. As the continuation of a small voluntary tagging program by NFRDI, the observer in cooperation with fishermen placed tags on 35 yellowfin and 1 skipjack tunas and released them.

Table 1. Catch (mt) and CPUE (mt/set) by school types of the Korean tuna purse seine fishery during the scientific observation in 2007

school types	No. of set	Success rate (%)	skipjack tuna		yellowfin tuna		Subtotal (skj+yft)		Total	
			catch	CPUE	catch	CPUE	Catch	CPUE	catch	CPUE
Free-swimming school	32	21 (66%)	481.4	15.0	219.2	6.8	700.6	21.9	881.6	27.6
Log-associated school	2	2 (100%)	219.5	109.8	0.5	0.3	220.0	110.0	220.4	110.2
total	34	68	700.9	124.8	219.7	7.1	920.6	131.9	1102.1	137.8

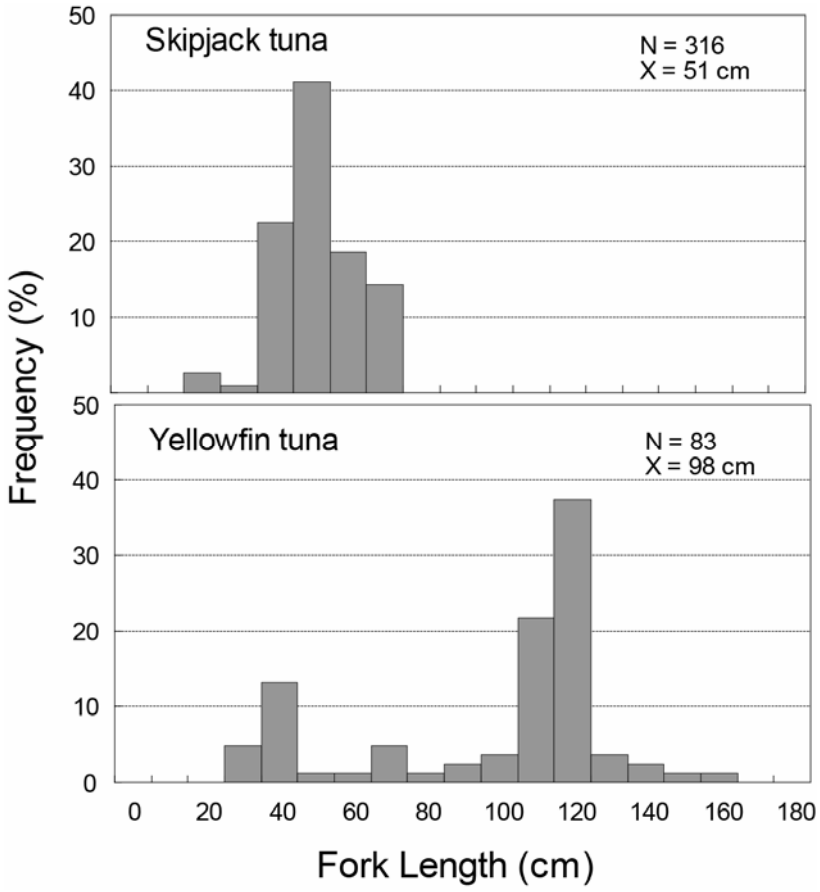

Fig. 2. Length frequency distributions of skipjack and yellowfin tunas.

Longline fishery

To monitor the Korean tuna longline fishery operated in the Pacific, one trained observer was deployed to Korean longliners (410 GRT) fishing in the Western Central Pacific Ocean (hereinafter WCPO area), between 04°08'-06°19'S and 170°05'-171°58'W (Fig. 3). Two trained observers were deployed to Korean longliners (416 and 384GRT) fishing in the Northern Pacific Ocean, between 25°00'-40°00'N and 165°57' N-150°00'W.

Western and Central Pacific Ocean (WCPO) area

During the 57 days of the observation period from 24 July to 18 September 2007, a total of 21 longline sets (one set per day) were monitored. The average number of baskets used for each set was averaged 164 and hooks used ranged from 2,550 to 2,890 (17 hooks per basket). Mean length of main line was 135km and those of buoy line were 40m. Length of branch line was 43 m and 10m length of lead line was used. Lead material was nylon monofilament with diameter 1.8mm. The fishing vessel used no.3.6 tuna hooks.

Longline setting began at around 9:00am in the morning and finished by noon and after about 3 hours of soaking, the longline was hauled until the following morning by 7:00am. Twenty one haulings were immediately begun where the settings were finished and three haulings were done at the starting point of setting. Total of the 58,650 hooks were observed by the on-board observer.

Catches sampled by the observer were 38mt of tuna and billfishes, of which bigeye tuna was the dominant tuna species accounting for 51.1% of the total catch in weight, followed by yellowfin tuna of 13.6mt (35.8%), and albacore of 2.5mt (6.5%). Billfishes incidentally caught were blue marlin (2.3%), swordfish (2.4%) and striped marlin (1.2%) (Table 2).

A total of 19 bycatch species (495 in number) were observed during the trip, among which billfishes, sharks, escolar and lancetfish were most common and some other fish species were also observed. (Table 3).

Length frequency data for the sampled tuna and billfishes were collected. The fork length of bigeye tuna ranged from 66cm to 176cm (mean 119cm) and that of yellowfin tuna ranged from 60cm to 164cm (mean 121cm) with mode at 125cm. On the other hand the fork length of albacore ranged from 55cm to 115cm (mean 98cm) with dominant small-sized fish (Fig. 4 (a)).

Northern Pacific Ocean (NPO) area

One was during the 135 days of the observation period from 17 October 2007 to 23 February 2008, a total of 108 longline sets (one set per day) were monitored. The average number of baskets used for each set was averaged 145 and hooks used ranged from 150 to 2,726 (averaged 15 hooks per basket). Mean length of main line was 104km and those of buoy line were 30m. Length of branch line was 43 m and 7m length of lead line was used. Lead material was nylon monofilament with diameter 1.8mm. The fishing vessel used no.3.6 tuna hooks. Another was during the 136 days of the observation period from 17 October 2007 to 29 February 2008, a total of 120 longline sets (one set per day) were monitored. The average number of baskets used for each set was averaged 162 and hooks used ranged from 300 to 3,040 (averaged 14 hooks per basket). Mean length of main line was 111km and those of buoy line were 25m. Length of branch line was 40 m and 10m length of lead line was used. Lead material was nylon monofilament with diameter 1.8mm. The fishing vessel used no.3.6 tuna hooks.

Both longline settings began at around 8:00am in the morning and finished by noon and after about 3~4 hours of soaking, the longline was hauled until the following morning by 6:00~7:00am. Total of the 243,580 and 283,729 hooks were observed by the on-board observer.

Catches sampled by the observer were 143mt of tuna and billfishes, of which bigeye tuna was the dominant tuna species accounting for 32.9% of the total catch in weight, followed by yellowfin tuna of 3.4mt (2.4%), and albacore of 62.2mt (43.4%). Billfishes incidentally caught were swordfish (4.3%) and striped marlin (1.9%) (Table 4).

A total of 37 bycatch species (5,638 in number) were observed during the trip, among which billfishes, sharks, escolar and lancetfish were most common and some other fish species were also observed. (Table 5).

Length frequency data for the sampled tuna and billfishes were collected. The fork length of bigeye tuna ranged from 43cm to 195cm (mean 117cm) and that of yellowfin tuna ranged from 52cm to 167cm (mean 106cm) with mode at 85cm. On the other hand the fork length of albacore ranged from 47cm to 190cm (mean 103cm) with dominant small-sized fish (Fig. 4 (b)).

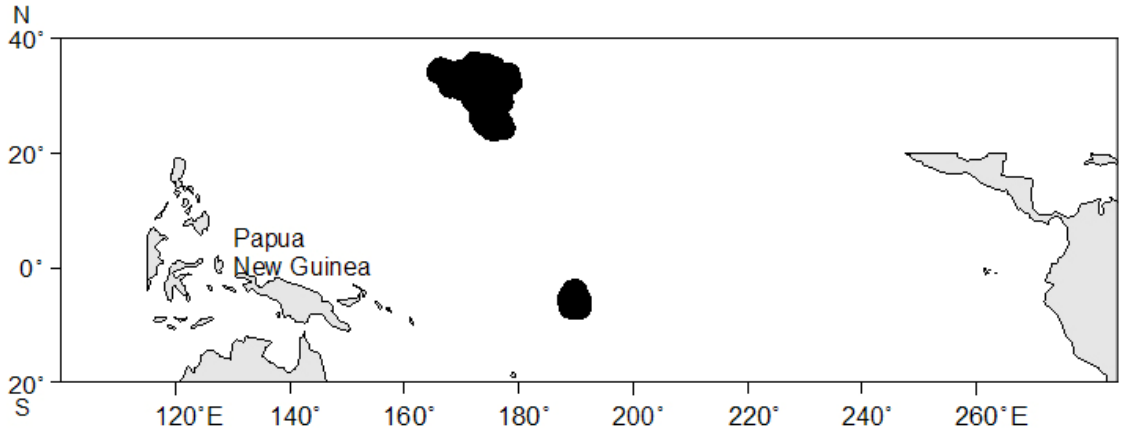

Fig. 3. Longline observation points.

Table 2. Catch and CPUE of tunas and billfishes in WCPO

Species	Catch			CPUE (/100hooks)		
	No.	%	Wt. (kg)	%	No	Kg
Albacore	140	11.4	2,473	6.5	0.25	4.48
Bigeye tuna	562	45.6	19,417	51.1	1.02	35.18
Blue marlin	19	1.5	891	2.3	0.03	1.61
Shortbill spearfish	4	0.3	47	0.1	0.01	0.09
Skipjack tuna	22	1.8	207	0.5	0.04	0.38
Striped marlin	8	0.6	455	1.2	0.01	0.82
Swordfish	35	2.8	913	2.4	0.06	1.65
Yellowfin tuna	443	35.9	13,629	35.8	0.80	24.69
Total	1,233	100	38,031	100	2.23	68.90

Table 3. List of bycatch species in the WCPO

Species	No. of fish	Ratio (%)	Species	No. of fish	Ratio (%)
Escolar	156	31.5	Barracuda	6	1.2
Ocean whitetip shark	93	18.8	Crocodile shark	4	0.8
Snake makerel	61	12.3	Grey reef shark	3	0.6
Lancetfish	46	9.3	Longfin mako	2	0.4
Blue shark	28	5.7	Opah	2	0.4
Galapagos shark	28	5.7	Bigeye thresher	1	0.2
Wahoo	24	4.8	Mako shark	1	0.2
Pelagic stingray	17	3.4	Ocean sunfish	1	0.2
Sickle pomfret	12	2.4	Sailfish	1	0.2
Black pomfret	9	1.8			

Table 4. Catch and CPUE of tunas and billfishes in NPO

Species	Catch			CPUE (/100hooks)		
	No.	%	Wt. (kg)	%	No	Kg
Albacore	3,398	54.9	62,176	43.4	0.64	11.79
Bigeye tuna	2,035	32.9	65,837	46.0	0.39	12.49
Blue marlin	0	0.0	0	0.0	0.00	0.00
Shortbill spearfish	11	0.2	157	0.1	0.00	0.03
Skipjack tuna	375	6.1	2,805	2.0	0.07	0.53
Striped marlin	84	1.4	2,674	1.9	0.02	0.51
Swordfish	143	2.3	6,187	4.3	0.03	1.17
Yellowfin tuna	140	2.3	3,370	2.4	0.03	0.64
Total	6,186	100	143,206	100	1.17	27.16

Table 5. List of bycatch species in the NPO

Species	No. of fish	Ratio (%)	Species	No. of fish	Ratio (%)
Blue shark	2,149	381.2	Indo-pacific marlin	9	1.6
Escolar	1,216	215.7	Smooth Hammerhead	9	1.6
Shortnose lancetfish	523	92.8	Loggerhead sea turtle	8	1.4
Mako shark	465	82.5	Sharptail mola	4	0.7
Sickle pomfret	396	70.2	Bigeye thresher	3	0.5
Opah	236	41.9	Black marlin	3	0.5
Pomfret	148	26.3	Grey reef shark	3	0.5
Oilfish	90	16.0	Loggerhead sea turtle	3	0.5
Dolphinfish	84	14.9	Bluefin tuna	2	0.4
Snake makerel	83	14.7	Longfin mako	2	0.4
Crested oarfish	66	11.7	Slender suckerfish	2	0.4
Wahoo	25	4.4	Luvar	1	0.2
Green sea turtle	19	3.4	Ocean sunfish	1	0.2
Ocean whitetip shark	19	3.4	Oceanic puffer	1	0.2
Pelagic stingray	18	3.2	Sandbar shark	1	0.2
Pelagic thresher sharks	14	2.5	Scalloped Ribonfish	1	0.2
Razorback scabbardfish	12	2.1	Slender mola	1	0.2
Velvet dogfish	11	2.0	Tiger puffer	1	0.2
Crocodile shark	9	1.6			

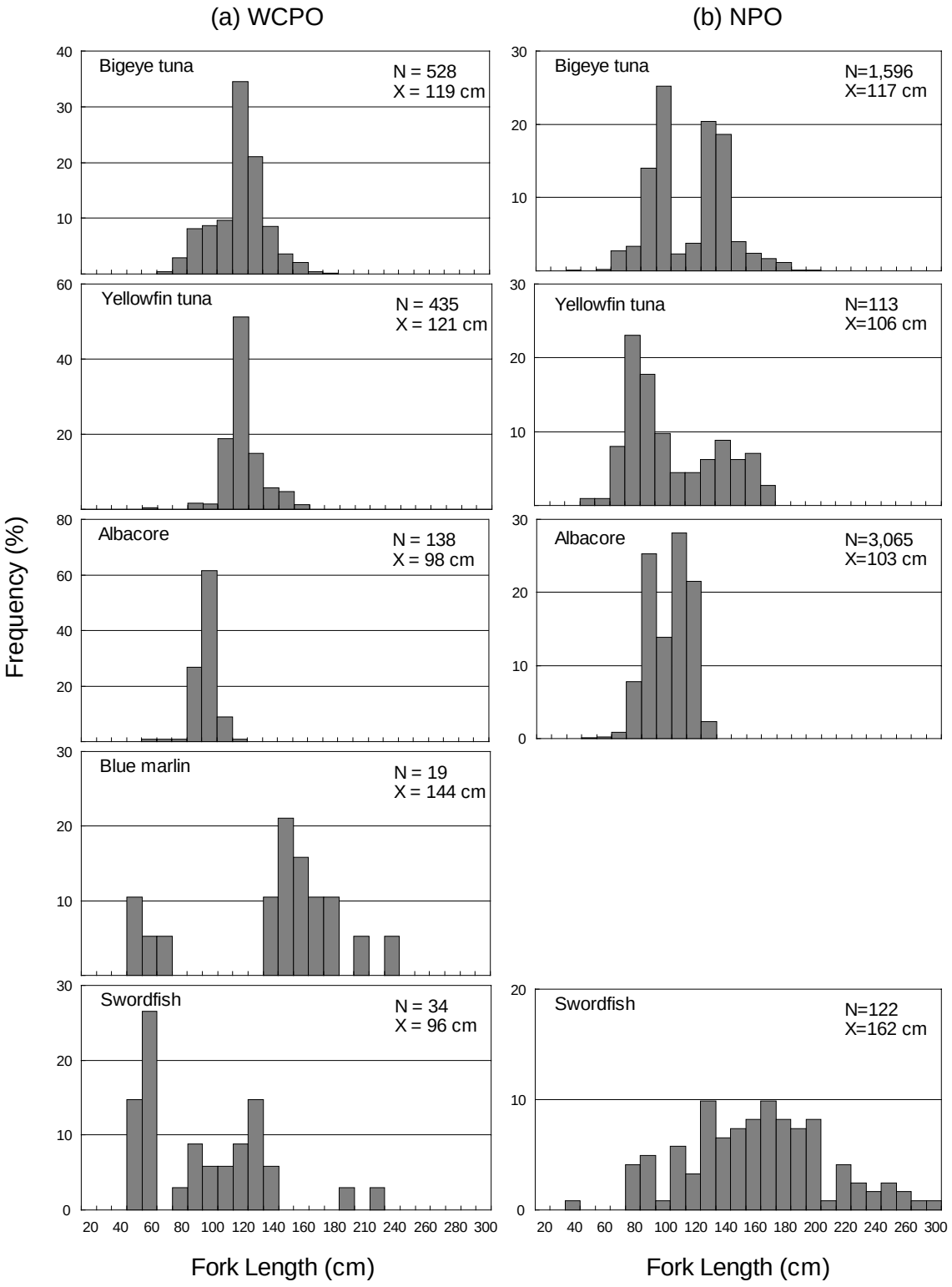

Fig. 4. Frequencies of fork length of tunas and eye to fork length (EFL) of billfishes in the (a) WCPO area and (b) NPO.