Chinese tuna longline fishery in the Indian Ocean in 2005

DAI Xiaojie XU Liuxiong, SONG Liming and
Shanghai Fisheries University,
334 Jungong Road, Shanghai 200090, China

1. INTRODUCTION

Since mainland China began to tuna longline fishery in the Indian Ocean in 1995, longlining fishing has been the only fishing methods applied by the fishing fleets for tuna and tuna-like species in the IOTC waters. At the peak time in 1998, the recorded number of fishing boats were 120, most of them were small non-professional boats reconstructed from trawlers or gill-netters which were operated along Chinese coastal waters before reconstruction. After 1998 number of fishing boats reduced with year due to the poor management, low economic performance and fishing ground shift to the Pacific Ocean. Total number of tuna fishing boats registered with IOTC Secretariat reduced to 93 in 2001 and down to 63 in 2002 and remains 67 in 2005. The number of the larger scale deep frozen longliners increased from 16 in 2003 to 38 in 2005(see table 1). Fishing area of Mainland China fishing fleet in 2005 was 40-85ºE, 25ºN-25ºS. Fishing efforts and catch (bigeye and yellowfin) distribution in 2005 are indicated in Fig.1 and Fig2. In 2005, some of deep frozen longliners seasonally accessed to fish in the EEZs of some coast nations , such as Pakistan and Tanzania by getting the fishing license.

2. CATCH STATISTICS

The total nominal catch of tuna and tuna-like species in the IOTC waters in 2005 is 14,307MT in round weight, 7.38 % increase compared with that in 2004(see table 2). The main reasons for the increase of the catch are as the following:

1) The increase of fishing effort with the increase in the number of large scale deep frozen longliners in tuna fishing fleet and improvement of fishing technology by introducing Super spool longline system to small scale tuna longliners;

2) Technical training of the fishing masters organized by the Branch of Distant Water Fisheries of China Fisheries Association and implemented by SFU;

3) Fish resources survey jointly conducted by fishing company and fisheries university and institutes;

4) Higher CPUE of Bigeye or Yellowfin tuna resulted from the seasonal access to

EEZs of some coast nations by some of deep frozen longliners.

The catch of BET increased from 8321MT in 2004 to 8867MT in 2005 and that of the yellowfin tuna (YFT) from 3781MT to 4259MT accordingly. Catch of other species including swordfish (SWO) and albacore (ALB) are 1181 MT.

Approximately 93% of the Chinese total tuna catch came from the west part of the Indian Ocean (Table 3). And 91.0% of the bigeye tuna catch was caught within the above area.

CPUE (kg per 1000 hooks) in IOTC waters by month from 2000 to 2005 is indicated in Fig.3 and table 4. The peak CPUE (combined species) occurred in 2004, followed by in 2003 and 2005. Fishing Efforts (x 1000 hooks) in IOTC waters by month from 2000 to 2005 is indicated in Fig. 4 and table 4. Fishing Efforts increased from 21,545 thousand of hooks deployed in 2004 to 30,696 thousand of hooks in 2005 (see table 3).

3. FISHERIES MANAGEMENT

Shanghai Fisheries University (SFU) has been responsible for the programs of the training and data collection and compilation of the Indian Ocean tuna fishery statistics with the cooperation of the Branch of Distant Water Fisheries of China Fisheries Association.

SFU also run training courses on the data formulation and collection, fisheries management measures adopted by regional international fisheries management organizations, such as IOTC, and fishing technical related conservation, such as sea turtles and sharks.

A working group for tuna fishery in SFU is also in charge of the national tuna observer program in the Pacific Ocean, Atlantic Ocean and Indian Ocean which is authorized by the Bureau of fisheries, Ministry of Agriculture. The scientific observer program has been carried out normally under the fully cooperation of the Branch of Distant Water Fisheries of China Fisheries Association and supported by Shanghai Fisheries University. So far, graduate and post graduate students majoring in marine fisheries science & technology, marine fisheries resources from Shanghai Fisheries University have been chosen as the candidates for tuna scientific observers.

Two observers were dispatched on board the fresh tuna longliners in the Indian Ocean from Sep. to Dec. in 2005, covering the area of $0^{o}47'$ N～$10^{o}16'$ N，$61^{o}40'$ E～$70^{o}40'$ E. Besides the basic biological measurement, observers also did the environmental measurements by CTD, TDRs, dissolved oxygen meter, plankton sampler. SFU tuna working group submitted the secretariat the size frequency data of Bigeye and Yellowfin tuna collected from the observer program. A comparison of the effect of the circle hooks and ring hooks on the catch rate of main targeting tuna species was also conducted by observers during their mission, and the preliminary result will be presented in this working group meeting (see the document IOTC-2006-

xx). Length-frequency distribution of bigeye and yellowfin tuna is showed in Fig.5 and Fig.6.

Chinese Fisheries Authority will continue to strengthen the management of her tuna fisheries as a responsible fisheries nation, main measures to be taken includes:

1) Strengthening the implementation of fishing license system. Chinese government will issue " High Seas Fishing Permit" to all legal fishing boats operating in high seas, the "fishing permit " explicitly specifies fishing area, main targeting species and quota, fishing time of the boat holding the permit, so that the harbor nations can easily have a check if the boat enters their harbor.
2) All fishing companies have to report their catch data every month to Tuna Working Group of the Branch of Distant Water Fisheries of China Fisheries Association.
3) Continuing to implement the national tuna observer program in three Oceans. Concerning the Indian Ocean, one observer will be dispatched on board the fresh tuna longliners in Aug. 2006. The fishing boat the observer works on will operates at the area 03º 00′ S～01º 00′ N， 62º 00′ E～69º 00′ E. According to our schedule, the observer will spend about four months on the fishing boat and does both biological and environmental measurements. The observer will also conduct some scientific research works, including application of mitigation measures, such as using the circle hook, tori line to test the effect of preventing or reducing the incidental catch of sea turtle, sharks and sea birds by request of the Branch of Distant Water Fisheries of China Fisheries Association .
4) All the large scale tuna longliners install the VMS equipments, starting from 1st Oct. 2006.
5) Strengthening the consultation with relevant nations who are willing to accept Chinese tuna boats about fishing access, assuring their legal access and normal fishing operation.
6) Encouraging scientists to conduct research on the incidental catch of sea turtles and sea birds, request fishing companies to report situation about the incidental catch of sea turtles and sea birds if there is any.
7) Put logbook system as normal management work. Pilot logbook data submission system was tried last year in order to obtain more detailed information about catch and fishing effort. Fisheries Bureau, Ministry of Agriculture this year requests that all fishing boats have to fill logbook as required format and will take implementation of logbook system as one of the main considerations for renewing the fishing permission and licenses.
8) Through improving the data report system, submitting fisheries statistics to regional tuna fisheries management organizations as required.

In addition, our government will strictly implement the measures recommended in the GOA meeting, such as limiting the number of fishing vessel and capacity,

Reference

1. XU Liuxiong and DAI Xiaojie, National report of China in IOTC waters in 2004. IOTC-2005-SC-INF13.

2. XU Liu-xiong, SONG Li-ming, GAO Pan-feng, JIANG Wen-xin ,WANG Jia-qiao. Catch rate comparison between the circle hooks and the ring hooks in Chinese ice fresh longliners in the tropical high seas of the Indian Ocean based on the observer data. IOTC-2006-wpxx-xx

Table 1. Number of Chinese Tuna Fishing Fleet in 1995-2005 in the Indian Ocean

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number	12	52	89	120	96	98	93	63	63	63	67

Table 2. Catch of tuna and tuna-like species during 1995-2005 (round weight in MT)

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
YET	138	494	750	402	2335	2362	1771	1325	2279	3781.2	4,259
BET	140	466	1652	2164	2182	2699	2994	2792	4569	8321.2	8,867
SWO	71	238	255	117	270	372	263	397	753	687.6	625
ALB	-	-	-	-	189	3	21	41	31	62	51
SBF	-	-	-	-	-	-	-	-	14	0	-
SHX	-	-	-	-	187	98	-	-	-	0	-
BIL	--	-	-	-	287	486	380	255	148	218	271
OTH	96	299	306	396	712	487	293	112	79	254.4	234
Total	444	1497	2964	3080	6162	6507	5722	4922	7873	13324.3	14307

Table 3 Nominal Catch in Metric tons from Chinese Longline Fleet by Species and Fishing Areas between 2000 and 2005

Year	Area	Total hooks (x1000)	BET	YFT	ALB	SWO	BIL	SHK	OTH	TOTAL
2000	E	17,627.7	1,822.1	2,055.2	0	293.6	343.8	94.8	308.5	4,918
	W	3,838.6	876.5	306.3	2.8	78.6	142.1	3.6	179.1	1,589
	SUM	21,466.3	2,698.6	2,361.5	2.8	372.2	485.9	98.4	487.6	6,507
2001	E	15,303.6	2,105.0	1,287.8	19.6	169.9	258.3	0	167.6	4,008.2
	W	4,690.8	889.3	483.5	1.6	92.7	121.3	0	125.2	1,713.6
	SUM	19,994.4	2,994.3	1,771.3	21.2	262.6	379.6	0	292.8	5,721.8
2002	E	4614.6	875.4	446.9	20.8	70.2	36.8	0	23.5	1473.6
	W	8728.5	1917	878	19.8	326.6	218.1	0	88.9	3448.4
	SUM	13343.1	2792.4	1324.9	40.6	333.8	252.9	0	112.4	4922
2003	E	1159	310.7	96.8	5.6	47.9	19.3	14.1(SBF)	12.0	506.4
	W	14315	4258.1	2182.3	25.1	705.2	129.2	0(SBF)	67.2	7367.1
	SUM	15474	4568.8	2279.1	30.7	753.1	148.5	14.1	79.2	7873.5
2004	E	3046	1084.2	208.4	5.7	73.7	34.1	0	28.4	1434.5
	W	18500	7237.1	3572.9	56.2	613.9	183.8	0	226.0	11889.9
	SUM	21546	8321.3	3781.3	61.9	687.6	217.9	0	254.4	13324.4
2005	E	2807	797	94	2	36	16	0	9	953
	W	27890	8070	4165	50	589	255	0	225	13355
	SUM	30697	8867	4259	52	625	271	0	234	14307

Table 4 CPUE (kg per 1000 hooks/month) and fishing Effort (x 1000 hooks) in IOTC waters by month, 2000-2005

Year		Jan.	Feb.	March	Apr.	May	June
2000	Effort	1,924.5	2,003.9	2,254.3	2,355.1	2,244.6	1,897.5
	CPUE	311.7	288.9	266.5	299.9	271.9	291.0
2001	Effort	1733.7	1723.4	1752.3	1736.6	1713.1	1667.6
	CPUE	277	302.5	293	272.3	307.2	258.4
2002	Effort	1100.1	891.9	1033.1	875.1	1291.7	941.9
	CPUE	392.6	344	358.7	372.8	286.8	265.5
2003	Effort	1263	1196	1341	1269	1258	1117
	CPUE	514	516	417	526	719	568
2004	Effort	1588	1426	1638	3004	1497	1355
	CPUE	758	780	687	508	738	585
2005	Effort	1952	2042	2463	2880	2944	2627
	CPUE	490	505	447	676	536	499
Year		July	Aug.	Sep.	Oct.	Nov.	Dec.
2000	Effort	1,005.3	993.4	957.4	1,458.4	2,086.5	2,285.4
	CPUE	338.0	351.0	327.8	346.3	314.1	304.2
2001	Effort	1263.1	1118.8	1927.7	1630.7	1794.6	1932.8
	CPUE	231.9	294.7	248	255.7	268.3	402.2
2002	Effort	1204.6	1074.8	1019.2	1317.4	1312.4	1280.9
	CPUE	329.5	343.5	352.1	211.7	457.3	509
2003	Effort	1253	1275	1381	1305	1361	1456
	CPUE	440	319	442	461	579	608
2004	Effort	1605	1556	1577	1652	2256	2391
	CPUE	500	636	486	466	580	76
2005	Effort	2316	2872	2370	3001	2586	2643
	CPUE	356	314	386	384	490	501

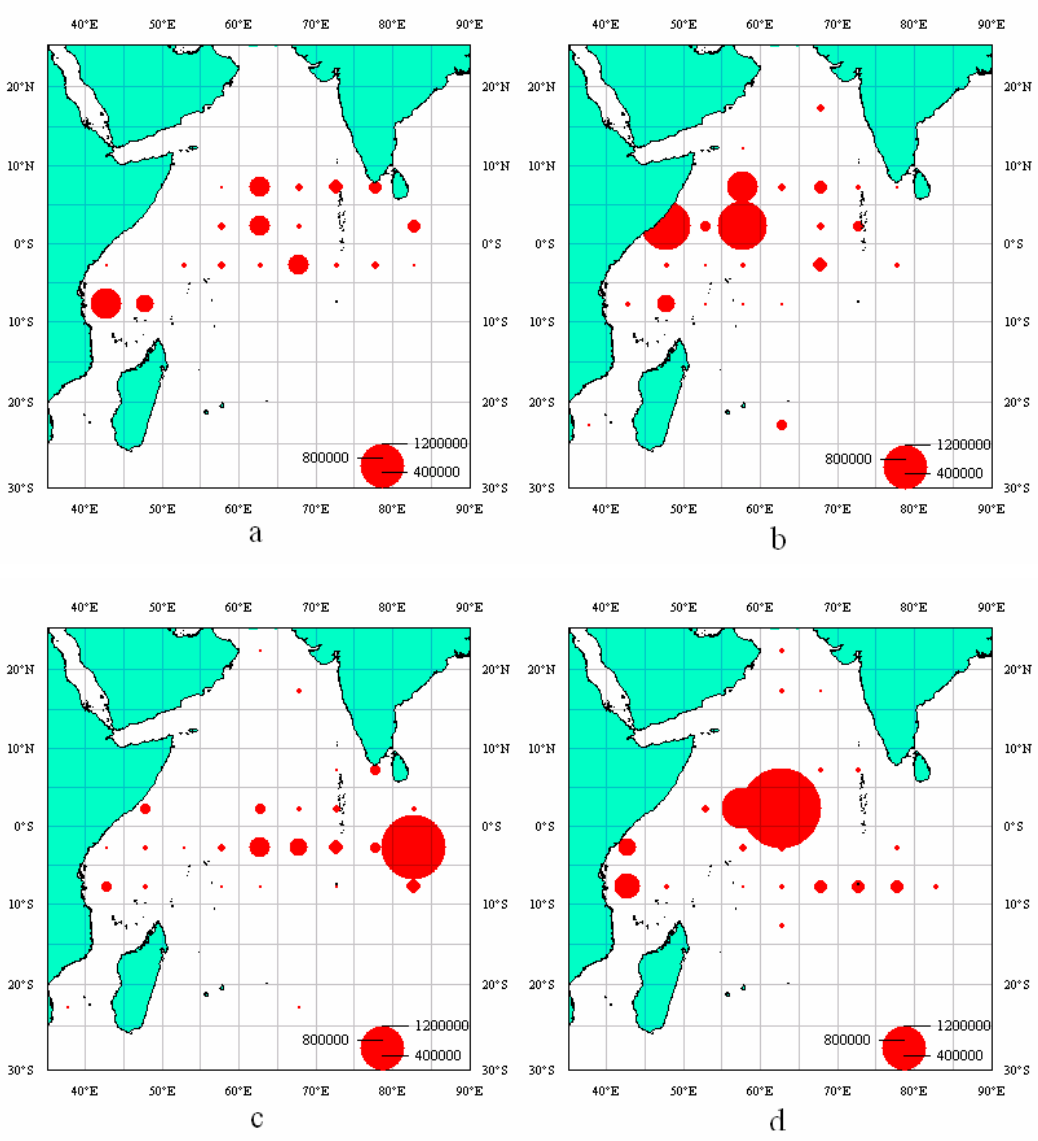

Fig. 1 The distribution(area: $5^{o} \times 5^{o}$) of fishing effort in the Indian Ocean by quarter (a: the first quarter; b: the second quarter; c: the third quarter; d: the fourth quarter)

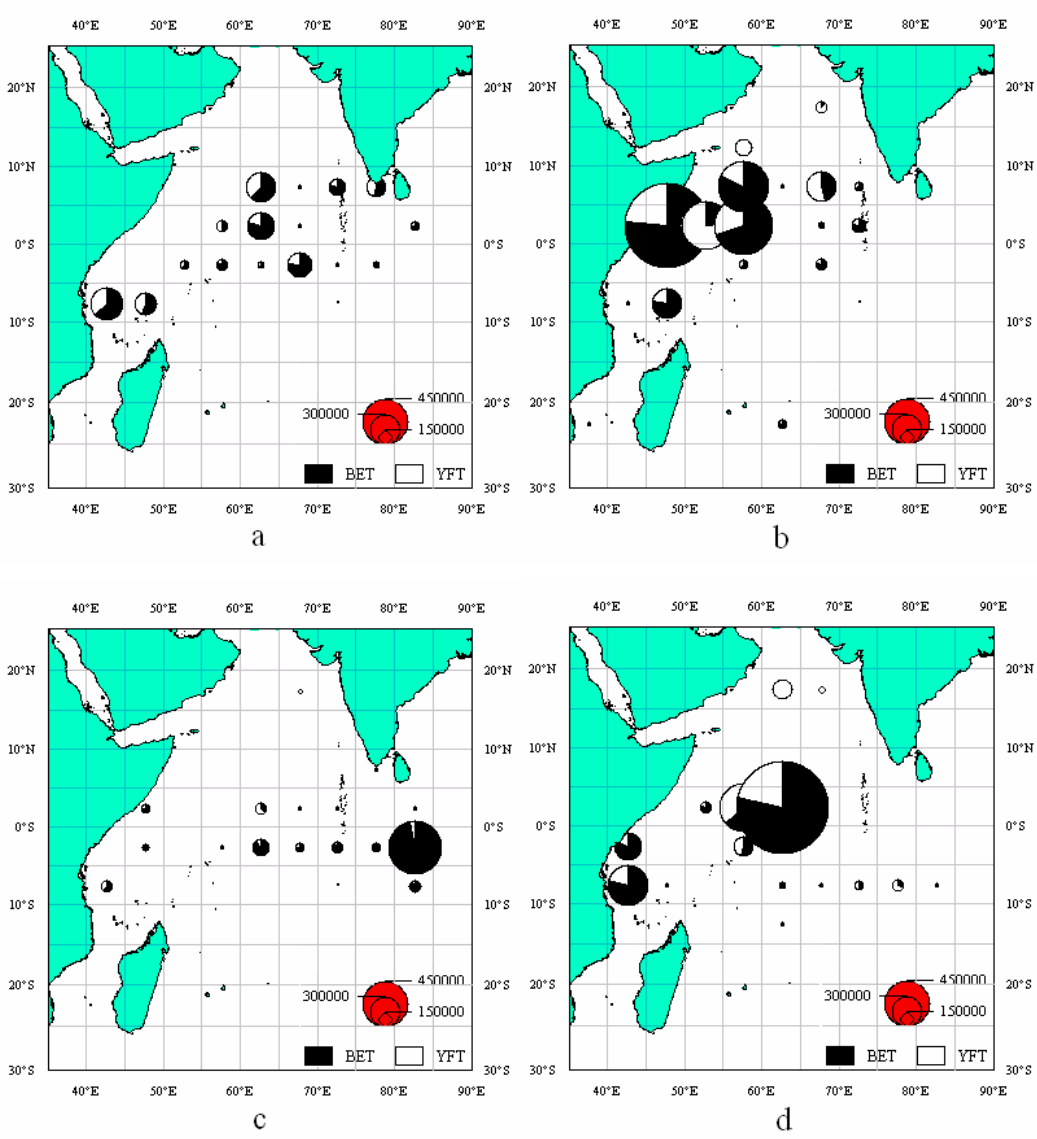

Fig. 2 The distribution(area: $5^{o} \times 5^{o}$) of catch by species(BET, YFT) by quarter(a: the first quarter; b: the second quarter; c: the third quarter; d: the fourth quarter) in the Indian Ocean

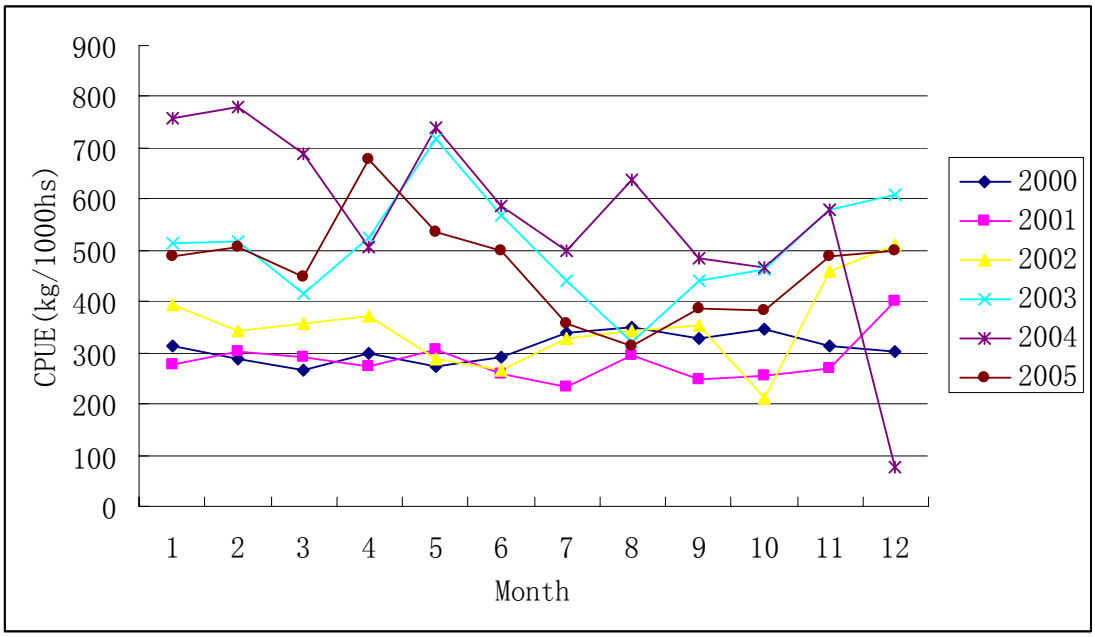

Fig.3 CPUE (combined species) distribution of the mainland China in 2000—2005 (by month)

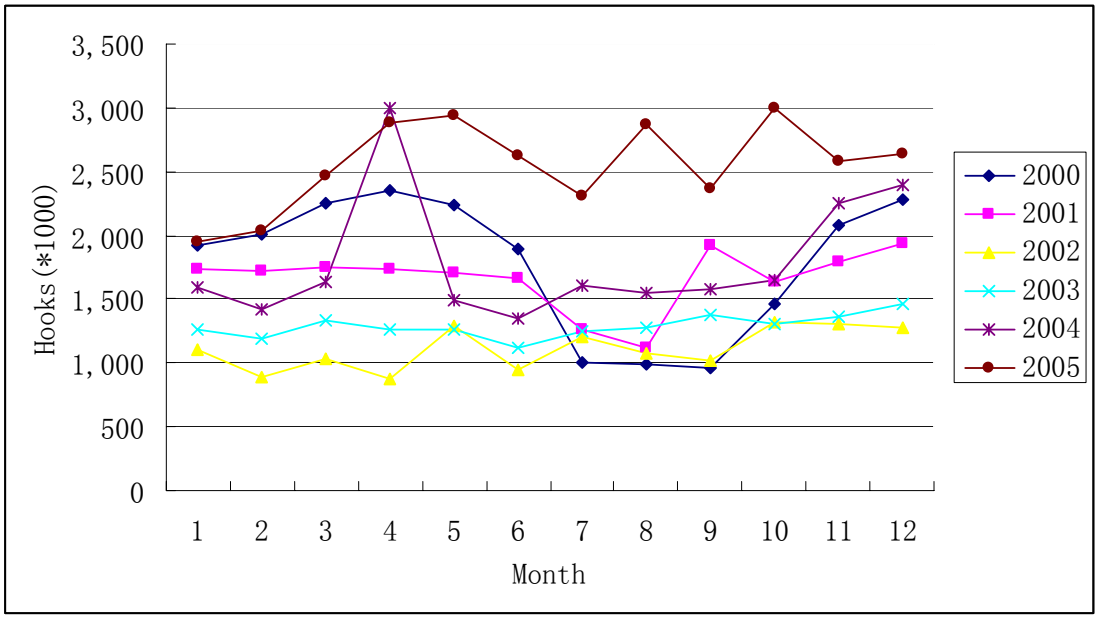

Fig.4 Efforts distribution of the mainland China in 2000—2005 (by month)

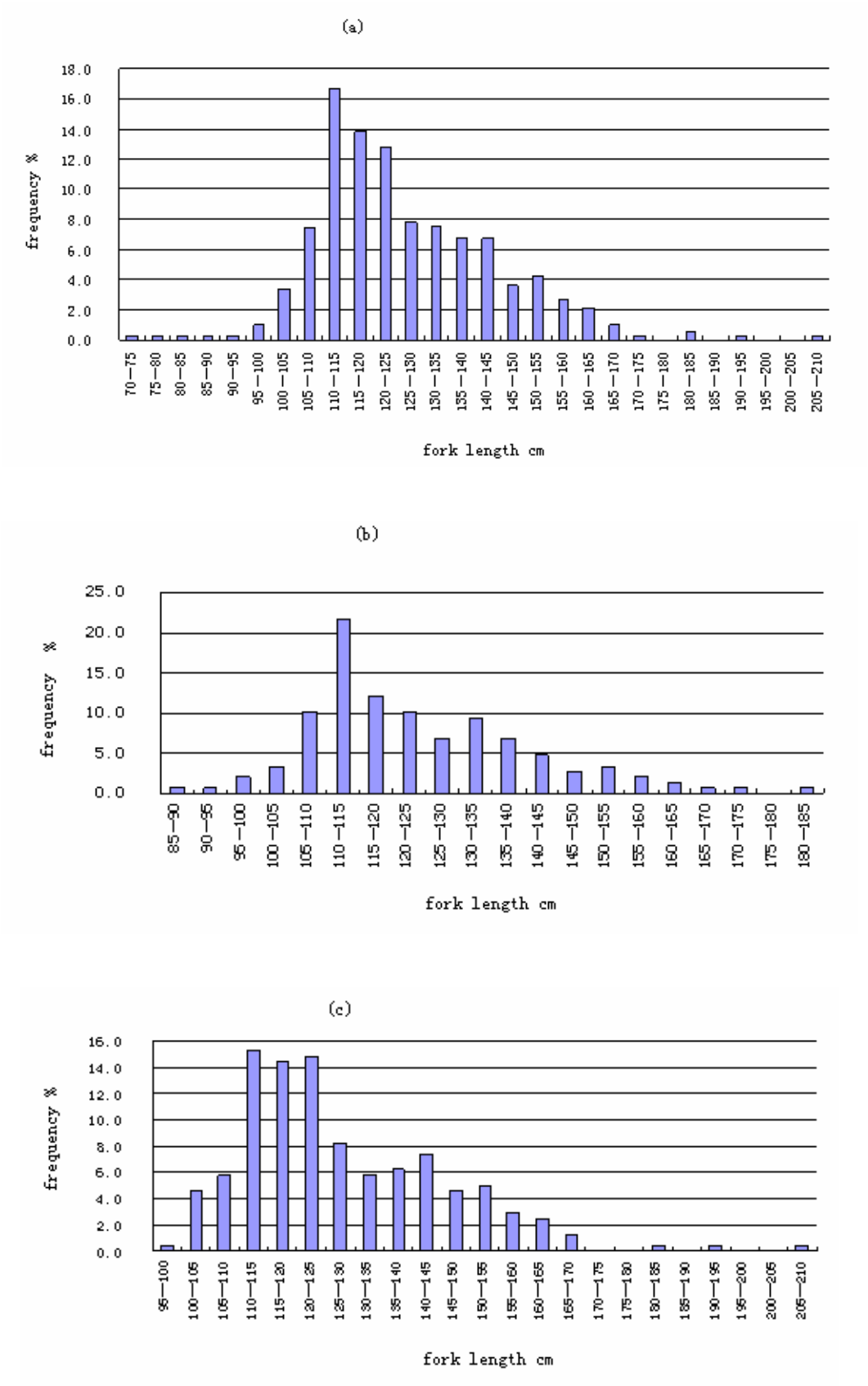

Fig.5 Length-frequency distribution of bigeye tuna (in5cm interval) from observer data (Spt-Dce,2005), (a) mix; (b) female ; (c) male

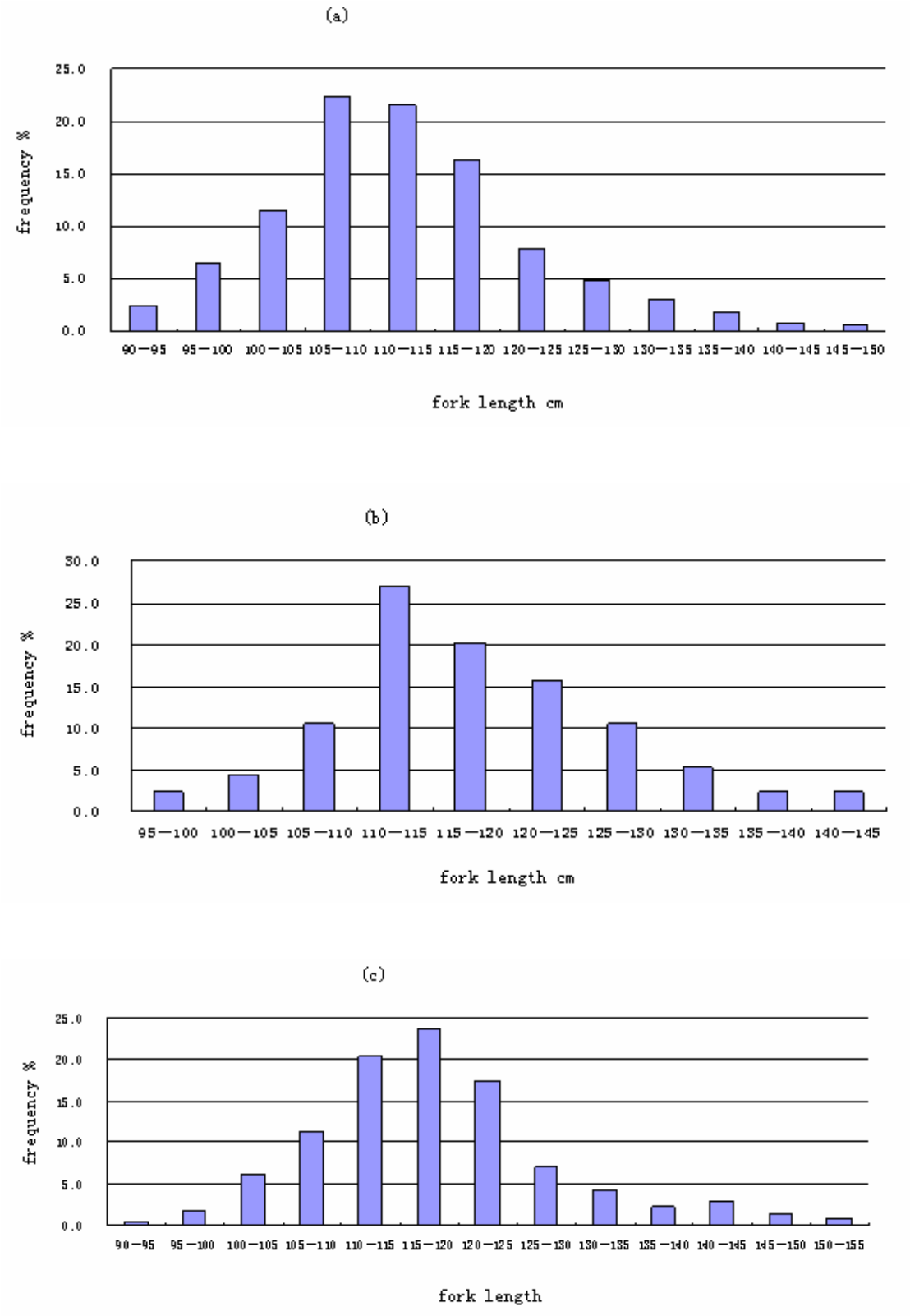

Fig. 6 Length-frequency distribution of Yellowfin tuna (in 5cm interval) from observer data (Spt-Dce,2005) (a) mix ; (b) female; (c) male