

A PRELIMINARY EVALUATION OF CHINESE BILLFISH LANDINGS DURING 1994-1996

Dai Xiao-jie^{1,2}, Zhou Ying-qi¹, Xu Liu-xiong¹ and Song Li-ming¹

SUMMARY

The estimated catch of billfish by four Chinese longliners during 1994-1996 is reported. Billfishes caught as by-catch species by Chinese longliners included blue marlin (Makaira nigricans), white marlin (Tetrapturus albidus), and sailfish (Istiophorus albicans), amounting to nearly 10% of the total catch (about 66 t annually during the years mentioned above). Of these species, blue marlin comprises 60%-68% of total billfish catches. Monthly CPUE of billfishes are also presented. Suggestions are made for improving Chinese billfish catch data in the future.

RÉSUMÉ

Le présent document présente la capture estimée d'istiophoridés par quatre palangriers chinois en 1994-1996. Les istiophoridés capturés en tant que prise accessoire par les palangriers chinois comprennent le makaire bleu (Makaira nigricans), le makaire blanc (Tetrapturus albidus) et le voilier (Istiophorus albicans), qui constituent près de 10% de la prise totale (environ 66 TM/an pendant les années susvisées). Parmi ces espèces, le makaire bleu (Makaira nigricans) représente 60-68% de la prise totale d'istiophoridés. Les valeurs mensuelles de CPUE des istiophoridés sont également présentées. Des suggestions sont formulées pour améliorer les données chinoises sur la capture d'istiophoridés à l'avenir.

RESUMEN

Se comunica la captura estimada de marlines de cuatro palangreros chinos durante 1994-1996. Los marlines capturados por los palangreros chinos como captura fortuita incluían aguja azul (Makaira nigricans), aguja blanca (Tetrapturus albidus) y pez vela (Istiophorus albicans) y comprendían cerca del 10% de la captura total (cerca de 66 t anuales durante los años anteriormente mencionados). De estas especies, la aguja azul constituye el 60-68% de las capturas totales de marlines. También se presenta la CPUE mensual de los marlines. Se hacen sugerencias para mejorar los datos de China sobre captura de marlines en un futuro cercano.

KEYWORDS

Tuna fisheries, Longlining, Fish catch statistics, data collection, Logbooks, Fishing effort, By catch, Catch/effort

¹ College of Oceanography, Shanghai Fisheries University, P.O. Box 85, 334 Jungong Road, Shanghai, 200090, P.R.China.

² E-mail: xjdai@shfu.edu.cn

INTRODUCTION

Four Chinese tuna longliners began to operate in the central equatorial waters of the Atlantic Ocean in 1993. This fishing fleet mainly targeted bigeye tuna and yellowfin tuna, which are of important commercial value. Billfishes, including blue marlin, white marlin, sailfish and spearfish have been caught in small amounts as by-catch species. Since becoming a contracting party to ICCAT in 1996, China has submitted longline-related data required by this organization. However, due to low economic value and difficulty in fish species identification, billfish landings are reported together as “BILLFISH UNCLASSIFIED” or mixed with sharks, or as “OTHER” species in the Task I Data Form required by ICCAT. During 1993–1997, there were no billfish landings (except 18 t in 1996) in the total landings submitted to the ICCAT Secretariat. These data required to be revised according to a scientific observer investigation in accordance with ICCAT Recommendations and Resolutions. In order to obtain accurate data for ICCAT billfish stock assessments, it is absolutely necessary to evaluate historical billfish landings based on scientific observer investigations. Revised billfish data can be applied to stock assessment model. This report is a summary of the results of the data collected at sea in the Atlantic Ocean between 1994–1996.

DATA AND METHODS

During 1994–1996 (except during the months of April to June, when Chinese longliners fished in the Mediterranean Sea for bluefin tuna), the author worked as a scientific observer on board the tuna longliners of China National Fisheries Corporation (CNFC) in the central Atlantic Ocean (09°N~05°S, 34°W~18°W). Fisheries data used in the present study were derived from the logbook of sample vessels of CNFC. The catch per unit effort (CPUE), given in numbers of fish caught per 1,000 hooks, was based on the sampled data and fishing effort statistics compiled from logbooks. The logbook data were validated by observer investigation.

Data collected by observer include date, location (Latitude/longitude), gear type, set direction, time of rigging, bait type, catch by species, Low jaw-fork length (LJFL, measured with tape). Dressed weight (DWT) with headed and gutted and all fins and spines removed, was registered in the logbook. The dressed weight could be converted to total weight according to ICCAT (1990).

RESULTS AND DISCUSSION

Fishing effort

According to logbook data, fishing effort of the sampled longliner was around 0.40 million hooks in 1994 (approximately 8 months of operation) and around 0.45 million hooks in 1995 (approximately 8 months). Total fishing effort in for four Chinese longliners that operated in the Atlantic Ocean was estimated as 1.59 million hooks in 1994 and 1.80 million hooks in 1995 (Table 1 and Table 2). Sampled fishing effort in 1996 has not been obtained due to the end of observer investigation.

Catch and CPUE

Catch of billfish by the Chinese sample longliner JINGFENG No. 1 during 8 months in 1994 was around 7957 kg DWT (252 individuals). And, catch of billfish from the sample longliner JINGFENG No. 2 during 8 months in 1995 was around 24476 kg DWT (678 individuals). In fact, the catch of the longliner JINFENG No. 2 was highest in 1995 among the four fishing vessels. On the other hand, the billfish catch actually unloaded from the four Chinese longliners during August 1995 and March 1996 amounted to around 66 t DWT, which can be converted to round weight 79.2 t (ICCAT, 1990), comprising 9.72% of total catch (tuna and tuna-like species). Therefore, it was estimated that the catch of billfish by the four Chinese longliners was about 66 t DWTEach year between 1994–1996.

Blue marlin

The individual size of blue marlin was obviously larger than that of other billfish species. Based on the investigation, dressed weight of the species generally exceeded 45kg. This made it easier to distinguish blue marlin from white marlin, spearfish and sailfish. Statistics on blue marlin were more accurate than those for other billfish species.

Blue marlin catch accounted for about 60.27% of the billfish catch during 1994 (8 months) and about 67.86% during 1995.

The monthly CPUE of blue marlin fluctuated between 0.0 and 0.348 fish per 1000 hooks (Table 4). Average CPUE from May 1994 to March 1995 amounted to 0.139 fish per 1000 hooks, higher than that reported by Korean longline fleet (Jong-Bin Kim, Dae-Yeon Moon and Seon-Jae Hwang, 1996).

Average lower jaw-fork length(LJFL) was 217.7 cm, and average dressed weight was 82.7 kg in 1994 in the study areas. In 1995, average LJFL was 217.2cm, and average dressed weight was 86.4kg.

Atlantic sailfish, Atlantic white marlin and spearfish

Due to the high and large dorsal fin, it is easier for Chinese fishermen to identify sailfish, compared with the identification of Atlantic white marlin and spearfish. Before March 1995, sailfish landings were separately registered as "SAILFISH" in the logbooks. Thus, accurate CPUE for this species could be obtained from the logbooks. Since March 1995, however, due to relatively low economic value, almost all the billfish species (excluding blue marlin) were registered together in one column as "SAILFISH" in the logbooks.

According to individual measurements, size of Atlantic white marlin (DWT) appear to be larger than they are for spearfish. Individual dressed weights of spearfish would generally not exceeded 25kg and individual dressed weights of Atlantic white marlin would generally not exceeded 40kg.

The monthly CPUE of sailfish was between 0.0 and 0.250 fish per 1000 hooks during May 1994 and March 1995. Monthly combined CPUE of white marlin and spearfish even reached 1.528 fish per 1000 hooks in February 1995 (Table 4). Research indicated that the ratio of white marlin to spearfish in the catch by number was 2.3:1.0 during the above periods. Table 5 shows monthly CPUE of billfish between August 1995 and March 1996.

The average lower jaw-fork length(LJFL) of sailfish was 180 cm and the average dressed weight 18.0 kg, according to the measurements taken between May 1994 and March 1995. The average LJFL of white marlin and spearfish were 162.6 cm and 168.5cm respectively; and their average dressed weights were 20.4 kg and 16.25 kg, respectively.

In fact, accurate CPUE and catch of all billfish species could be obtained by strict logbook registration conducted by fishermen with simple billfish taxonomic knowledge. To achieve this objective, a logbook collection system is being established. In order to validate the logbooks, a scientific observer program should be carried out. China will make significant progress on billfish research and collection of statistics in the near future.

CONCLUSION

Billfishes have been caught as by-catch species by the Chinese tuna fisheries in the Atlantic Ocean targeting bigeye tuna. The proportion of billfish catch was near 10% of the total catch during the period 1994-1996, about 66 t in dressed weight. Blue marlin comprised of 60%-67% of billfish catch.

REFERENCES

- ICCAT. 1990. Field manual for statistics and sampling Atlantic tuna and tuna-like fishes. 3rd ed. ICCAT, Madrid, Spain.
- KIM Jong-Bin, Dae-Yeon Moon and Seon-Jae Hwang. 1996. Demography of billfishes incidentally caught by the Korean tuna fisheries in the Atlantic Ocean. Col. Vol. Sci. Pap. ICCAT, 47: 267-271.

Table 1. Monthly changes of the Chinese sample longline effort in the Atlantic Ocean in 1994 (vessel JINFENG NO.1).

Month	5	6	7	8	9	10	11	12	Total
NO. of set	29	17	18	22	23	23	26	23	181
Total hooks	61366	36002	38051	50168	50894	48970	57420	53750	396621
Average hooks/set	2116	2117	2113	2280	2212	2129	2208	2237	2192
Fishing area	B	B	B	A	B	B	A	A	A

Estimated effort by four Chinese longliner: 1.59 million hooks

⚠️Note: Before May, 1994, no longliners began to operate in the Atlantic Ocean

A indicated the area 05° N~12° S, 35° W~20° W

B indicated the area 02° N~08° S, 30° W~18° W

Table 2. Monthly changes of Chinese sample longline effort in the Atlantic Ocean in 1995 (vessel JINFENG NO.2)

Month	1	2	3	4-6	7 & 8	9	10	11	12	Total
No. of set	24	23	19	/	33	22	25	20	29	195
Total Hooks	56955	53670	41828	/	68580	53291	58747	46732	69899	449702
Average hooks/set	2373	2333	2201	/	2078	2422	2350	2337	2410	2306
Fishing area	A	A	A		B	B	A	B	A	

Estimated effort by four Chinese longliner: 1.80 million hooks

Table 3. Monthly changes of the Chinese sample longline effort in the Atlantic Ocean in 1996 (vessel JINFENG No.2).

Month	1	2	3	4-7	8	9	10
No. of set	30	27	19	/	13	29	13
Total hooks	71060	61355	43845		26155	60415	30390
Avg. Hooks/set	2369	2272	2308		2012	2074	2338
Fishing area	A	A	A		B	B	B

Table 4. Monthly CPUE (No. /1000 hooks) changes of billfish by Chinese sample tuna longliner in the Atlantic Ocean 1994-1995.

Year	Month	Billfish	Sailfish	blue marlin	White marlin & Spearfish	
1994	5	0.619	0.212	0.277	0.130	
	6	0.917	0.250	0.083	0.584	
	7	0.578	0.210	0	0.368	
	8	0.199	0.020	0.100	0.079	
	9	0.275	0.138	0	0.137	
	10	0.245	0	0.041	0.204	
	11	1.288	0.226	0.348	0.714	
	12	0.912	0.186	0.186	0.540	
	1995	1	1.738	0.246	0.211	1.281
		2	1.789	0.112	0.149	1.528
		3	1.134	0.131	0.131	0.872

Table 5. Monthly CPUE (No. /1000 hooks) changes of billfish by Chinese sample tuna longliner in the Atlantic Ocean 1995-1996.

Year	Month	Billfish	blue marlin	white marlin, spear sailfish and sailfish
1995	8	0.685	0.306	0.379
	9	1.295	0.394	0.901
	10	1.838	0.647	1.191
	11	2.782	1.027	1.755
	12	1.545	0.572	0.973
1996	1	0.985	0.493	0.492
	2	0.652	0.228	0.424
	3	0.798	0.205	0.593