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National Report of China

1 Brief Introduction of China CJM Fishery

Description of China CJM fishery

The Chinese trawling fleets caught Chilean jack mackerel (CJM) in the high seas off Chile since 2000. The number of Chinese fishing vessels varied between 11 and 13 during 2004-2009. The number of active vessels decreased continuously from 2010 and only two vessel in 2013 (Tab.1).

Table 1 Number of vessels and size of the Chinese trawling fleets from 2004 to 2013

Year	Number of fishing vessels	Registered tonnage, GRT		Gear type
		<4,000	≥4,000	
2004	12	10	2	pelagic trawl
2005	13	11	2	Pelagic trawl
2006	12	6	6	Pelagic trawl
2007	11	4	7	Pelagic trawl
2008	11	4	7	Pelagic trawl
2009	13	4	9	Pelagic trawl
2010	9	0	9	Pelagic trawl
2011	6	0	6	Pelagic trawl
2012	3	0	3	Pelagic trawl
2013	2	0	2	Pelagic trawl

Catch, effort and CPUE

Table 2 summarized the annual catch, effort and CPUE of China CJM fishery. Annual catch fluctuated between 2,318 and 160,000 ton from 2000 to 2012, and continued to decrease from 2009. In 2012, the catch dropt to 13,012 tons, the lowest level during the past ten yeas. CJM is the main target species in the catch in 2000 to 2012. Chub mackerel (*Scomber japonicus*) as by-catch was found 0% -10% in the catch in 2010 to 2012, and also a few of other spices, including jumbo flying squid (*Dosidicus gigas*), pacific scad (*Scomberomorus sierra*), yellowtail (*Seriola laland*) etc. In 2013, total catch was 6206 tons by August, among which CJM was 6009 tons, Chub mackerel was 124 tons and others species were 73 tons.

Fishing days were also decreased in resent yeses and below 1,000 form 2010. The annual average catch per fishing day per vessel reached the peak in 2006 and dropt to 50 in 2012.

The year effects estimated by the general additive model (GAM) showed a declining trend in catch rates from 2002 and 2012, except for a small rise in 2007. The estimated year effect in 2011 was only 0.33, the lowest value during 2001-2012, however it increased to 0.37 in 2012.

Table 2 Catch and effort and CPUE of CJM by Chinese fishing fleet

Year	Catch (ton)	Fishing day	Average catch per fishing day per vessel	GAM standardized CPUE (t/hour)	Year effect
2001	20,090	497	40	3.34	1.40
2002	76,261	1,477	52	4.98	1.97
2003	94,690	1,569	60	5.31	1.74
2004	131,020	2,271	58	4.21	1.44
2005	143,000	2,474	58	5.81	1.44
2006	160,000	1,811	88	6.84	1.02
2007	140,582	2,033	69	5.85	1.13
2008	143,182	17,23	83	6.76	0.86
2009	117,963	1,567	75	7.23	0.81
2010	63,606	921	69	4.42	0.57
2011	32,862	591	56	2.95	0.33
2012	13012	260	50	2.92	0.37
2013*	6009	-	-	-	-

Note: By August 2013, the total catch of CJM was 6009 tons.

The operational area of the Chinese trawling fleets widely distributed from outside the Chilean EEZ to 120°W. Fishing operation was normally concentrated on the high seas off central Chile, from 32°S to t 43°S and from 80°W to t 95°W , e.g. in 2011 (Fig. 1). However, about 36% of the total catch in 2012 came from the high seas off North Chile (Fig. 1), in which fishing activity of Chinese fleets lasted for 3 months, from September to November. Although this status happened in the 2008 fishing season, the ratio of the catch in North Chile to the total catch was less than 1%.

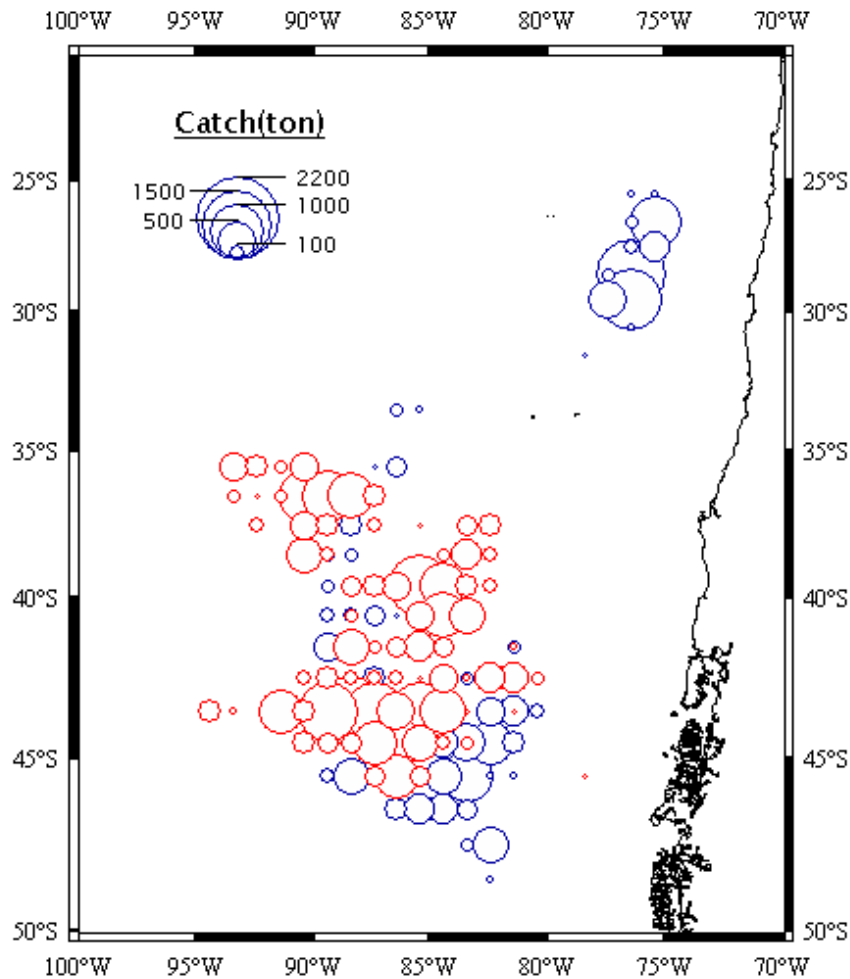


Figure 1 Spatial distribution ($1^{\circ} \times 1^{\circ}$) of CJM catch by the Chinese fleets in SPRFMO area in 2011 (red circle) and 2012 (blue circle)

2 Fisheries Data Collection and Research Activities

China Distant Water Fisheries Association (CDWFA) and Shanghai Ocean University (SHOU) jointly take charge of the JM fisheries data collection and research activities. The fisheries data collection was supported by China fishing fleet cooperating and cooperated with the China fishery scientific observers program. And a full log books collection program have been carried out from 2007 and delivered to SHOU for statistics and study purpose.

The biological data and environment data were measured and collected on board by the fishery scientific observers. And the catch data were collected from log books or directly sampled from the catch. Data from log book mainly are catch per tow, fishing time and positions, towing speed etc. Environment data about fishing ground are also collected including wind direction and speed, SST, and data of STD etc.

Biological items measured by means of the random sampling on board are fork length (FL), body height (BW), width and girth, body weight and net weight with organs, sex, germ cells maturity, contains in the stomach etc.

Depth of fish school inhabited in the water and temperature related were recorded by the echo sounder, net sounder and sonar.

The otolith collected on board and delivered to the SHOU laboratory for appraisal age.

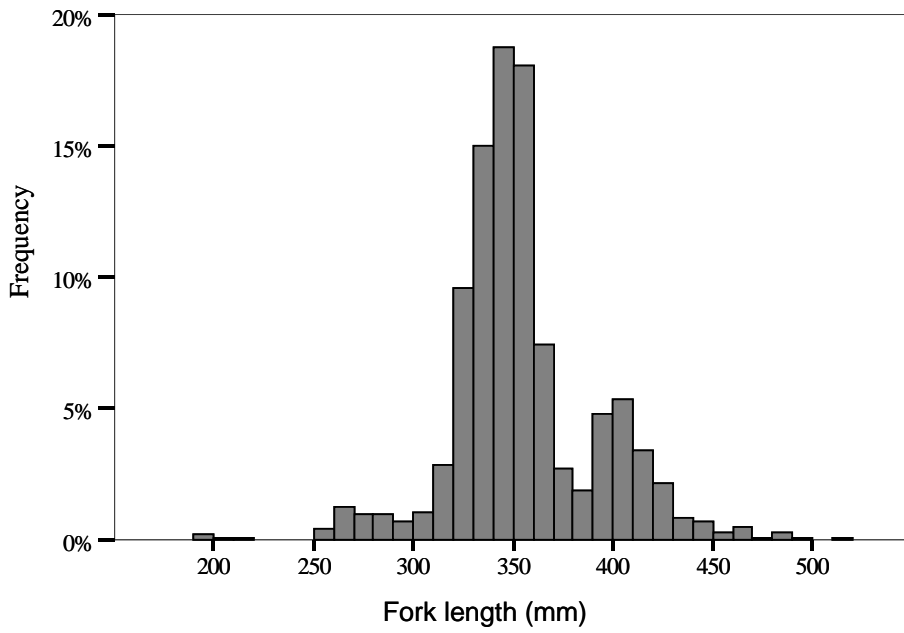
The maturity situation of germ cells and stomach containing were observed and sorted in six grades and five grades respectively according with the national standards of the Chinese marine fish survey.

Plankton and botany were collected in predetermined positions, and identified according to marine fishery survey standard.

The studies on CJM take by Chinese scientists were mainly in the fields of biological characteristic, distribution of stocks and population, fishing ground, oceanic environment. The major research activities in the future will be the stock assessment.

3 Biological Sampling and Length / Age Composition

1069 CJM were sampled from March to August 2012. 1045 pairs of otoliths were removed and 845 fish were aged successfully. Length frequency and basic information for the 1069 CJM were shown in Figure 2. The range of fork length was from 191 to 516 mm, mean fork length was 355mm. The estimated length-weight formula can be expressed as $BW=2.2189*10^{-5}FL^{2.9923}$ ($R^2=0.855$). The 845 aged fish ranged in age from 0+ to 8+ years, among of them, only 12 fish were younger than 2 year old (Table 3). Most of fish ranged in 4+ and 5+ years old with fork length ranged form 262 to 407mm.



Size class	250	300	350	400	450	500	550	600
Frequency	0.37%	4.12%	47.05%	34.80%	12.35%	1.22%	0.09%	0.00%
N	Ave. FL	Min FL	Max					
1069	355	191	516					

Figure 2 Fork length frequency of CJM in 2012

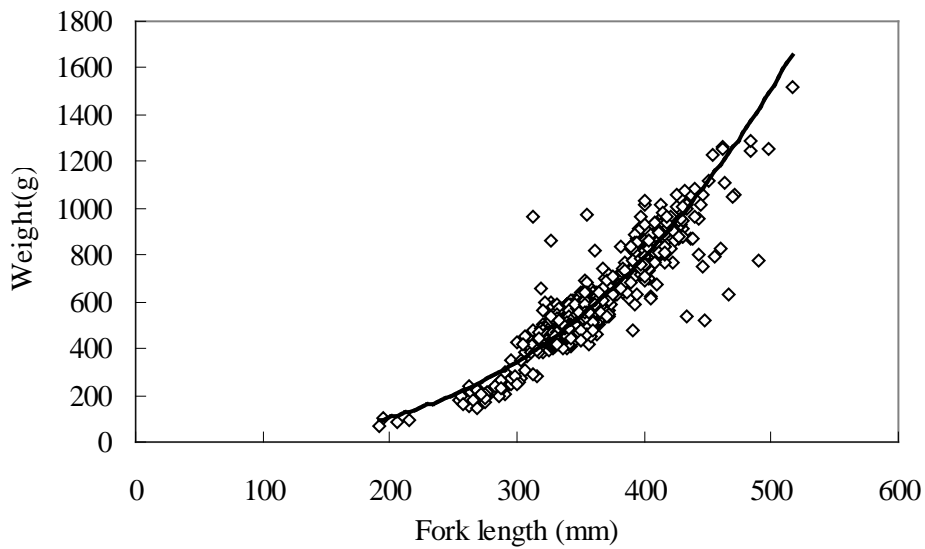


Figure 3 Length-weight relationships for CJM based on 1069 samples in 2012.

Table 3 Age frequency for CJM of different size class in 2012

Size class	Age class									N
	0+	1+	2+	3+	4+	5+	6+	7+	8+	
180-200	1	1								2
200-220		2								2
200-240		0								0
240-260		1	2	1						4
260-280		5	9	6	1					21
280-300		1	7	5	0	1				14
300-320		1	1	8	18	7				35
320-340			1	27	142	42	2			214
340-360				19	131	135	9	1		295
360-380				2	18	44	7	4		75
380-400					1	15	23	22	2	63
400-420						3	20	32	18	73
420-440							11	11	5	27
440-460							2	4	3	9
460-480								2	3	5
480-500								3	1	4
500-520								1	0	1
N	1	11	20	68	311	247	74	80	32	845

4. Fishery Scientific Observer Program

In order to implement “Standards for the collection, reporting, verification and exchange of data” of SPRFMO, China fishery Authority accredit SHOU for the observers training, selection and dispatch. SHOU also responds for the data evaluation and debugging, and related studies. The observer program has been continually under way since 2007, and the coverage rate of observers is about than 25-30%. In 2012, 2 observers were dispatched to “Kai Fu Hao” to execute the 2012 Observer Program.